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# PROJECT CHECO SOUTHEAST ASIA REPORT

AIRLIFT TO BESIEGED AREAS  
7 APR-31 AUG 72

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**PROJECT**  
**C**ontemporary  
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**C**urrent  
**O**perations  
**REPORT**

**AIRLIFT TO BESIEGED AREAS**  
**7 APR-31 AUG 72**

**7 DEC 73**

**HQ PACAF**

**Directorate of Operations Analysis**  
**CHECO / CORONA HARVEST DIVISION**

**Prepared by:**  
**Major Ringenbach**  
**Project CHECO 7th AF**

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**DEPARTMENT OF THE AIR FORCE**  
**HEADQUARTERS PACIFIC AIR FORCES**  
**APO SAN FRANCISCO 96553**



**PROJECT CHECO REPORTS**

The counterinsurgency and unconventional warfare environment of Southeast Asia has resulted in USAF airpower being employed to meet a multitude of requirements. These varied applications have involved the full spectrum of USAF aerospace vehicles, support equipment, and manpower. As a result, operational data and experiences have accumulated which should be collected, documented, and analyzed for current and future impact upon USAF policies, concepts, and doctrine.

Fortunately, the value of collecting and documenting our SEA experiences was recognized at an early date. In 1962, Hq USAF directed CINCPACAF to establish an activity which would provide timely and analytical studies of USAF combat operations in SEA and would be primarily responsive to Air Staff requirements and direction.

Project CHECO, an acronym for Contemporary Historical Examination of Current Operations, was established to meet the Air Staff directive. Based on the policy guidance of the Office of Air Force History and managed by Hq PACAF, with elements in Southeast Asia, Project CHECO provides a scholarly "on-going" historical examination, documentation, and reporting on USAF policies, concepts, and doctrine in PACOM. This CHECO report is part of the overall documentation and examination which is being accomplished. It is an authentic source for an assessment of the effectiveness of USAF airpower in PACOM when used in proper context. The reader must view the study in relation to the events and circumstances at the time of its preparation--recognizing that it was prepared on a contemporary basis which restricted perspective and that the author's research was limited to records available within his local headquarters area.

*Robert E. Hiller*

ROBERT E. HILLER  
Director of Operations Analysis  
DCS/Operations

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FOR THE COMMANDER IN CHIEF

*V. H. Gallacher*

V. H. GALLACHER, Lt Colonel, USAF  
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## FOREWORD

(U) During the 1972 Nguyen Hue Offensive, airpower played the dominant role in frustrating the North Vietnamese (NVN) plans to overrun all of South Vietnam. As a result of United States Air Force (USAF) and South Vietnamese strikes, vital supply routes were cut, massed forces were splintered, and armor and equipment were left in ruins. At times existing USAF tactics were used successfully; in other cases Seventh Air Force had to be innovative and flexible in making adjustments as a result of enemy antiaircraft weapons and tactics.

(U) While some traditional airlift tactics and doctrine proved viable throughout the campaign, hostile weaponry compelled some changes in aerial resupply. Yet, airlift aircraft, landing on short fields in besieged areas, encountered situations which paralleled previous experiences. Success required planning, courage, and a highly developed sense of professionalism--all of which were demonstrated by both air and ground crews. At Kontum, for example, the C-130s airlanded adequate supplies to sustain the city. (This technique was occasionally supplemented by airdrop.) Between 14 April and 3 May 1972, the C-130s carried a daily average of over 70,000 gallons of JP-4 jet fuel and aviation gas into the city. On the other hand, aerial resupply of besieged areas using the classic low level Container Delivery System did not function as expected. Highly accurate antiaircraft and small arms ground fire

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proved costly in terms of men and machines. These weapons made it virtually impossible for the low-flying aircraft to meet ground requirements with even a moderate chance of success at a reasonable cost. When the Air Force first abandoned the low level flights in favor of high-altitude airdrops, it found that the technology available in Southeast Asia was not sufficient to ensure consistent placement of supplies onto the small drop zones.

(U) With the North Vietnamese and Viet Cong surrounding key areas which were crucial to the defense of South Vietnam, aerial resupply became a necessity if the government forces were to withstand the offensive. That the Air Force was able to provide this airlift capability by quickly developing technology and tactics to overcome unexpected problems was a major factor in thwarting North Vietnamese designs in 1972.

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## INTRODUCTION

~~(S)~~ By all accounts, the North Vietnamese Nguyen Hue Campaign, fought during the spring and summer of 1972, was the most ambitious offensive ever launched by the North Vietnamese Army (NVA). Although the Tet offensive of 1968 was large in scale, it had more limited goals. In that campaign, the North Vietnamese planned to seize as many towns as possible throughout South Vietnam, to shake Allied confidence in the progress of the war, and to undermine the popular support for the government of South Vietnam. With massive American forces supporting South Vietnamese troops, the North Vietnamese did not really expect any solid, lasting military victories. Holding areas for even short periods of time, however, could serve as a tremendous psychological blow against the Allies.<sup>1</sup>

~~(S)~~ By 1972, the overall situation was vastly different. On 3 January 1972, with the completion of the KEYSTONE MALLARD (Increment X) redeployment and reduction, U.S. force levels in South Vietnam had dropped to less than 140,000. In addition, by that same date, President Nixon had announced another withdrawal (KEYSTONE OWL) that was to reduce U.S. personnel strength in South Vietnam to 69,000 by 1 May 1972.<sup>2</sup> These withdrawals and redeployments encouraged North Vietnamese planners to be more optimistic than they had been during the Tet offensive of 1968. In 1972, these planners apparently felt that the NVA was strong enough to seize and hold large areas of South Vietnam, thus eroding popular confidence in President Thieu's government. Further, an NVA victory would provide North Vietnam with a strengthened position at the Paris bargaining table.

[REDACTED]

(U) For some months before the actual beginning of the offensive, U.S. intelligence sources gathered considerable evidence that an NVN offensive was not only in the planning stages but also was possibly close to execution. In an attempt to forestall any such enemy action, the Allies increased reconnaissance activity and struck interdiction targets. At the same time, the USAF formulated a series of plans to strengthen U.S. air-power in Southeast Asia in the event that the predicted NVA offensive should materialize. As early as the end of December, 1971, limited execu-<sup>3</sup>tion of these plans was begun as a counterweight to the enemy buildup.

(S) By the end of March the North Vietnamese were ready to begin their long-expected offensive. They had approximately 164,000 combat troops inside South Vietnam and another 36,000 troops in nearby border areas. Poised to support these troops were huge stocks of sophisticated combat equipment including a variety of tanks, heavy artillery, antiaircraft artillery (AAA), and rockets. During the night of 29/30 March, Army of the Republic of Vietnam (ARVN) positions throughout South Vietnam received massive artillery, mortar, and rocket barrages. The offensive was about to begin.<sup>4</sup>

(S) On the following morning the invasion of South Vietnam began when one NVA division crossed the demilitarized zone into Military Region (MR) I. At the same time, two NVA divisions already in MR I moved against fire support bases north and west of Quang Tri City.<sup>5</sup> Elsewhere in SVN, enemy activity also increased. Throughout MR II the Viet Cong (VC) and NVA attacked fire support bases and other targets as a prelude to the



[REDACTED]

attack on Kontum.<sup>6</sup> That evening a series of actions in Tay Ninh Province heralded the NVA offensive in MR III,<sup>7</sup> although the main brunt of the force was not to hit Loc Ninh until 5 April.

~~(C)~~ The widely scattered attacks against a variety of targets soon merged into a general pattern. One of the goals of these attacks was "to divide the national ARVN reserves forcing piecemeal and, therefore, indecisive commitment of the forces."<sup>8</sup> The provincial capitals of Kontum and An Loc seemed particularly vulnerable to the enemy because of their relative isolation and their comparatively weak defenses; Quang Tri and Hue were also principal targets.<sup>9</sup> To increase the isolation of these capitals and to capture other isolated outposts and ranger camps more easily, the VC/NVA moved to interdict principal roads throughout South Vietnam. Successful interdiction meant that no reinforcements or supplies could enter the areas which the enemy had placed under siege. For example, in MR II alone, Routes 14, 21, 1, and 19 were cut, retarding the flow of supplies from the coastal areas into the Central Highlands. The situation was similar in MRs I and III.<sup>10</sup>

~~(C)~~ Throughout South Vietnam the large and strong VC/NVA forces--supported by devastating artillery fire and an unexpectedly large number of tanks--scored early victories. In MR I, within one week, all the outer fire support bases protecting Quang Tri City fell to intense artillery and ground attacks. By 1 May, Quang Tri was captured and ARVN forces fell back for the defense of Hue. For the next month the ARVN defenses shuddered but held, with airpower decimating attacking forces. Eventually,<sup>11</sup> the ARVN would be able to mount a counteroffensive against Quang Tri City.



[REDACTED]

( ) In MR 11 the VC/NVA continued attacks against fire support bases and the Ben Het Ranger Camp near Dak To. After overrunning Tanh Can and Dak To on 24 April, the VC/NVA focused on the Ben Het Ranger Camp and Kontum. Although Ben Het took hundreds of incoming rounds daily and remained surrounded, on 9 May USAF and Vietnamese Air Force (VNAF) gunships and tactical air (TACAIR) sorties destroyed enemy tanks, helping the defenders hold the camp.<sup>12</sup> Meanwhile, an NVA regiment cut Route 14 south of Kontum as NVA units began to drive toward Kontum from Dak To. Responding to a situation that was rapidly becoming desperate, USAF TACAIR struck the hostile forces, inflicting a casualty rate of almost 40 percent.<sup>13</sup> The NVA attempt to completely isolate Kontum succeeded only temporarily; it was broken by USAF TACAIR and B-52 strikes which were credited with "decisive" assistance to South Korean and ARVN troops.<sup>14</sup> On the night of 13/14 May, artillery and small ground probes preceded an attack of major proportions launched on the morning of 14 May. A battalion-sized infantry attack, supported by tanks, struck Kontum City from the northwest, but the ARVN 23d Infantry Division, equipped with M-72 Light Automatic Weapons (LAWs) and supported by helicopter gunships and TACAIR, halted the attack. Although attacks continued almost every day, the ARVN successfully held their positions with the assistance of TACAIR. Meanwhile, supplies dwindled because the USAF had halted all C-130 activity into Kontum on 12 May; consequently, on 18 May, the USAF began the C-130 resupply effort again although heavy fire still raked the airfield.<sup>15</sup>

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SOUTH VIETNAM

# KONTUM

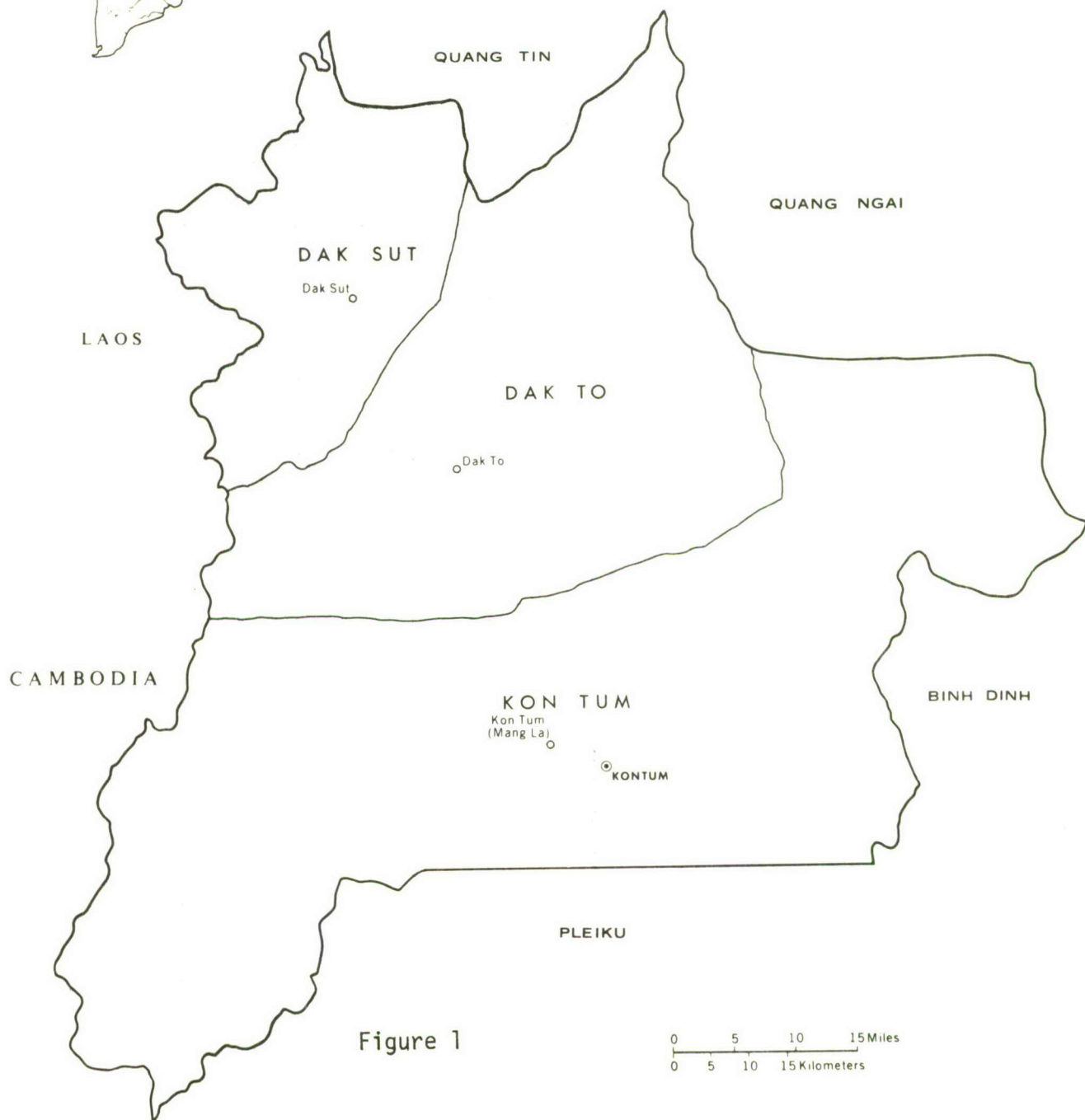


Figure 1

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(S) In MR III, after the fall of Loc Ninh, there was concern for the safety of the provincial capital of An Loc (Hon Quan). At 0730 on 13 April, two dozen tanks led a major ground attack against An Loc. A second ground attack began at 1015, and ARVN troops advancing to the capital from the south slammed into battalion-sized resistance and were halted. By 1330 the northern half of the town had fallen, but repeated TACAIR and B-52 strikes kept the VC/NVA forces off balance so that they were not able to sustain their attack. Conditions appeared to stabilize on 14 April, but at 0430, 1000, and 1400 on 15 April the VC/NVA hurled armor and massive ground assaults against the defenses in the southern half of An Loc. Steady pound-<sup>16</sup>ing by TACAIR and determined ground troops repelled the assaults.

(S) In addition to actions around the larger towns discussed above, VC/NVA units surrounded numerous isolated outposts, camps, and fire support bases throughout South Vietnam and in ARVN areas of operation in Cambodia. For example, Regional Forces at Mang Buk, near Kontum, repulsed ground<sup>17</sup> attacks, but a VC battalion surrounded their position. Many positions were too weak and fell quickly to the onslaughts. At Kampong Trach in Cambodia, elements of two NVA regiments sealed off the town and systematically destroyed all the ARVN artillery. The NVA frustrated all ARVN<sup>18</sup> efforts to reinforce and resupply the defenders.

(U) In commenting on the situation in MR III, Colonel William Miller, Senior Army Adviser, wrote to Major General James F. Hollingsworth, Commander of the Third Regional Assistance Command (TRAC), that the VC/NVA would "use strangulation and starvation tactics" until those surrounded at An Loc were

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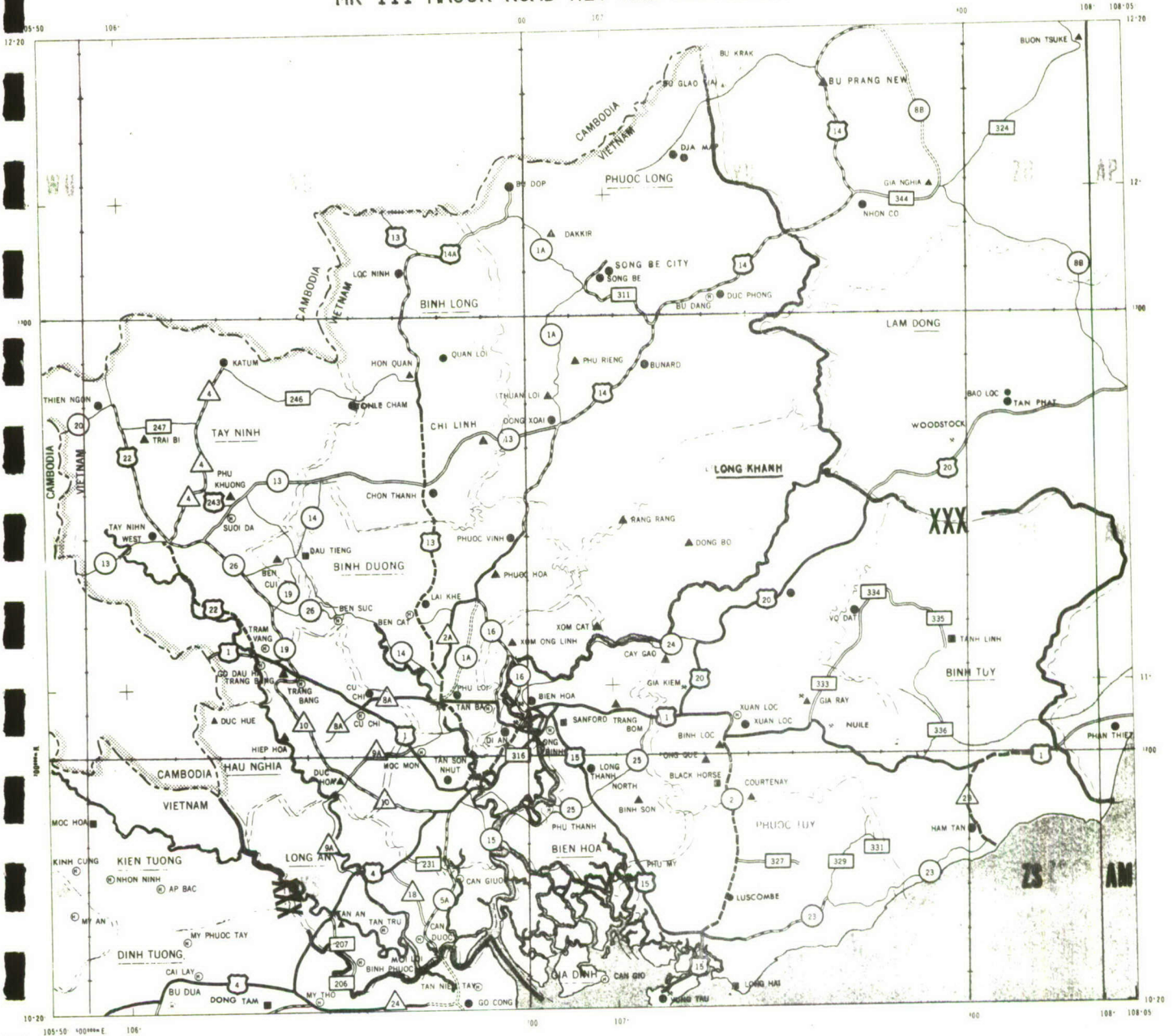


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exhausted. This assessment was equally correct for other areas in South Vietnam and Cambodia as well. In most cases, airpower, with its tremendous firepower, had kept these surrounded locations from being overrun. Too weak to overrun the defended positions, the VC/NVA elected to establish fortified positions, shell the defensive areas, and attack when conditions allowed. One VC/NVA hope was that they could keep supplies from reaching the defenders overland by interdicting highways, and that aerial resupply could be prevented by concentrations of AAA and the newly deployed heat-seeking surface-to-air missile, the SA-7. The USAF planned to provide sufficient supplies to the defenders until TACAIR and B-52 strikes could weaken the surrounding hostile forces. Thus, the stage was set for air-<sup>19</sup>lift to the besieged areas.

# UNCLASSIFIED

## MR III MAJOR ROAD NET AND AIRFIELDS



### ROAD CLASSIFICATIONS

CENCON STANDARD ROAD COMPLETED

CENCON STANDARD ROAD UNDER CONSTRUCTION

CLASS 31 ROAD

CLASS 18 ROAD

CLASS 5 ROAD

STATUS OF ROAD NOT KNOWN OR CLOSED

NATIONAL ROUTES (QL)

INTERPROVINCIAL ROUTES (LTL)

PROVINCIAL ROUTES (TL)

SUPPLEMENTARY ROUTES (RTE)

COMMUNAL ROUTES (HL)

### AIRFIELDS

ABANDONED

CLOSED

OPEN

C-130

C-123

C-7A

LIGHT AIRCRAFT

MAJOR HELIPORT

NOTE: Numbers within aircraft classification symbols denote the current airfield standard. See MACV Directive 415.9 for criteria.

### OTHER FEATURES

INTERNATIONAL BOUNDARY

PROVINCE BOUNDARY

PROVINCE NAME

RAILROADS

QUARRY SITES FOR MACV LOC

### NOTES

AIRFIELDS SHOW NORMAL CLASSIFICATION AS OF DATE OF PUBLICATION AND ARE SUBJECT TO CHANGE  
DELINEATION OF INTERNATIONAL BOUNDARIES MUST NOT BE CONSIDERED AUTHORITY

Figure 2

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CHAPTER I

CLASSIC AIRLIFT: PERILS AND PROBLEMS

(U) By 7 April VC/NVA troops, artillery, and AAA began closing off the city of An Loc from outside aid. Because civilian refugees continued to pour into the city, it appeared that the encirclement was not complete; however, the civilians of Loc Ninh and the surrounding areas were allowed to enter An Loc as part of the VC/NVA plan. Each additional person inside the provincial capital would further strain food, water, sanitation, and medical resources.<sup>20</sup>

~~(S)~~ Within a few days, the civilian refugees and government forces inside An Loc realized they would not be able to leave the city. On at least two occasions NVA artillery shells drove groups of refugees attempting to leave back into the city to keep the pressure on an overburdened supply system.<sup>21</sup>

~~(S)~~ With the provincial capital surrounded, the South Vietnamese Joint General Staff (JGS) took immediate steps to initiate resupply of the city. Initially this problem appeared to be one of logistics management and coordination, and JGS ordered VNAF to supply the city with the assistance of U.S. Army helicopters.<sup>22</sup> Having carried 80 percent of the total airlift requirements within South Vietnam prior to the beginning of the offensive, VNAF crews had amassed flying time and gained confidence. Thus, the JGS thought the VNAF crews would be able to provide adequate support to the besieged defenders at An Loc.<sup>23</sup> Between 7 and 12 April, U.S. Army and VNAF Chinook (CH-47) helicopters flew 42 sorties in support



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of An Loc. The helicopters had two principal limitations. First, they carried an average of only 3.5 tons per sortie, which meant that a large number of sorties would have to be flown to meet the ground requirements. Second, the helicopters proved highly vulnerable to VC/NVA gunners. Limited to landing at the same landing zone every mission, the helicopters were not able to take advantage of surprise tactics. Very early in the campaign, the VC/NVA gunners zeroed in on the landing zone, and in spite of a minimum unloading time, three U.S. helicopters sustained minor damage from exploding mortar shells. On 12 April the NVA scored a direct hit on a VNAF Chinook helicopter on the landing zone. Because of the vulnerability of this resupply effort, the Allies cancelled all further missions for the CH-47, and the OH-13<sup>24</sup> helicopters as well.

~~(S)~~ Concurrent with its helicopter airlift, the VNAF began flying supplies into An Loc using C-123 Providers. The airlift managers needed the C-123s to increase the total tonnage capability of the airlift effort. Because VNAF crews had no training in precise high-level drops using night navigational techniques, they were forced to use daytime low-level airdrops. Crews flew the missions in three- and four-ship formations at 600 to 800 feet, delivering the supplies with standard low-level paradrop techniques. Although the VNAF succeeded in delivering 195 tons of supplies, the slow-moving C-123s were easily hit with ground fire. On 15 April hostile fire claimed the first C-123, and on 19 April a second VNAF C-123, loaded with ammunition, was hit; it exploded three kilometers southwest of An Loc. The VNAF command cancelled all further C-123 low-level drops.<sup>25</sup>

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(S) In spite of the efforts of the VNAF crews, it became evident that they would not be able to deliver enough supplies to satisfy the ground requirements at An Loc. Thus, the Headquarters, Military Assistance Command, Vietnam (MACV) requested that the USAF begin to augment the VNAF supply efforts. Seventh Air Force tasked the 374th Tactical Airlift Wing (TAW) to undertake this mission beginning 15 April.

26

(C) The USAF C-130 airlift missions scheduled were low altitude, container delivery system (CDS) daylight airdrops. The CDS method was the "classic" aerial resupply technique and "normally" was considered "the most accurate of all airdrop procedures." In the classic approach, the C-130 loitered near the proposed drop zone until cleared to begin its drop run by whatever agency was controlling the airspace. (At An Loc the forward air controller--FAC--performed this function.) When given the signal to proceed, the C-130 approached the drop zone at tree-top level and at an indicated airspeed of 230 to 250 knots. Prior to the flight, the crew navigator determined the actual release point for the airdrop, the point referred to as the Computed Aerial Release Point (CARP). In flight, the navigator made slight adjustments for wind, temperature, and visual ground references. When the C-130 came within one or two minutes of the CARP, it "popped up" to 700 feet and slowed to 130 knots. Upon reaching the CARP the loadmaster released the pallets. After the pallets cleared the aircraft, the C-130 increased airspeed as it descended to minimum altitude and exited the area.

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~~(S)~~ From the first day of their participation in the An Loc resupply effort, USAF airlift crews had to perform under conditions that did not conform to usual CDS training. The most obvious difference was the drop zone. Because of the extreme pressure brought to bear against the defensive positions at An Loc, the only drop zone available was a soccer field 200 x 200 meters. This zone was smaller than the minimum CDS zone required by Air Force Manual 3-4 and, therefore, required much higher accuracy than crews had attained in manual airdrop training. (See Figure 3 for drop zone sizes at various locations.) The other major difference was the presence of accurate and heavy AAA fire, which was to increase in intensity over the next few weeks.

(U) On 15 April the first two C-130 aircraft approached the soccer field on the outskirts of An Loc. The Army had provided the grid coordinates for the field, and based on this information the navigators had computed the CARP for the mission. The Seventh Air Force staff had briefed the airlift crews to fly along Highway 13 into the southern end of An Loc where the soccer field was located. The VNAF had flown this route the previous few days and had found it effective because of the ease of navigation. At the FAC's signal the first C-130 headed for the target area and made its drop, taking only two hits from ground fire.

~~(S)~~ Approximately 15 minutes later the second C-130 began its high speed run to the drop zone. This time, within one minute of the CARP, AAA and other ground fire raked the flight path, scoring numerous hits on the plane. One round of .51 caliber fire smashed through the circuit breaker

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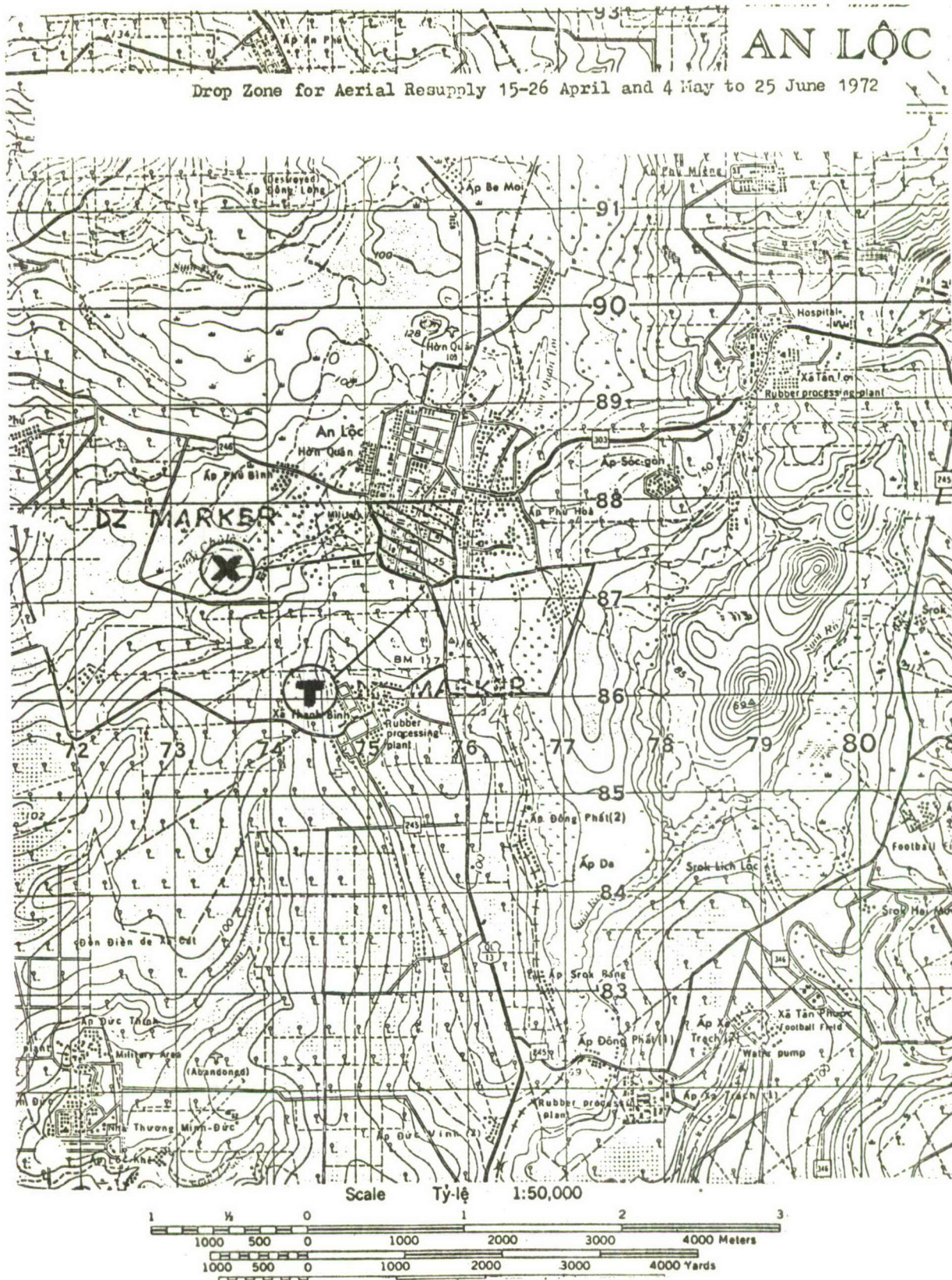


FIGURE 3

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panel in the flight deck, killing the flight engineer and wounding the navigator and the co-pilot. Meanwhile, other rounds tore through the cargo compartment, igniting some of the 12 pallets containing 155 millimeter (mm) howitzer and 81mm mortar ammunition. A hot-air duct ruptured pouring 700-degree heat into the cargo compartment. The pilot then attempted to jettison the smoldering cargo, but the automatic devices did not function. At this point the loadmaster cut the cargo loose by hand and then put out a dangerous fire that had erupted in the compartment. After many tense moments the aircraft returned safely to Tan Son Nhut Air Base (AB). (That very day, a VNAF C-123 fell to hostile fire in the same area.)<sup>30</sup>

(S) The gravity of the situation at An Loc was such that airlifters and FACs met that night to develop tactics to reduce the possibility of further damage and losses. In reviewing the day's events, they concluded that the first aircraft had escaped serious damage because of cloudy weather, but that after the first plane went in, enemy gunners were ready for the second one. Because it was obvious that the enemy had been monitoring the single frequency in use during the first two missions, the airmen decided to use five different tactical FM frequencies. To avoid having all C-130s coming in at the same headings, the airmen established six different tracks (lettered A through F) into the drop zone. The FAC would assess the current ground situation and give the best inbound and outbound tracks to and from the drop zone. Instead of using a CARP computation which required too much attention from the harassed crew, the navigator drew two circles around the drop zone, the first being a one minute warning,

and the second a release line. This permitted greater flexibility, enabling the crews to pass over the drop zone at the heading directed by the FAC. Finally, the C-130s were to remain in an orbit approximately 10 minutes

from the drop zone at a "safe" altitude of from 5,000 to 10,000 feet. The C-130 would make its run at 200-500 Feet AGL (500 Feet at night), slowing down 45-30 seconds ~~C-130 would make its run at about 3,500 feet, descending over the drop zone~~ from drop zone with an ascent to arrive over the drop zone on altitude and airspeed. ~~to release the cargo. Immediately after release the aircraft would descend~~ increase airspeed, and fly the escape track (lettered A through F) pre-selected by the FAC. The FAC would broadcast heading changes based on his observations of ground fire directed at the C-130. ~~31~~

The following morning two C-130s returned to An Loc, and the new procedures were implemented. Flying the lead aircraft was Colonel Andrew P. Iosue, Commander of the 374th Tactical Airlift Wing, and navigating was Major Robert Highley, 374th TAW's Chief Navigator of Standardization and Evaluation. Both men wanted to see at first hand the problems experienced by the crews the previous day. Using the coordinates received from the Army, which designated an open field east of Highway 13, they bracketed the drop zone. Although both aircraft were hit by hostile fire, the C-130s delivered 30,000 pounds of ammunition and supplies--all recoverable by the defending forces. <sup>32</sup>

(U) While the military situation on the ground continued to deteriorate, the weather over An Loc prevented aerial resupply attempts for almost two days. On the 18th another C-130 attempted the resupply mission. Two FACs were flying that day over the drop area. One FAC flew high and from his vantage point was overall air controller. <sup>33</sup> A second FAC (Captain Robert Shumway of the 21st Tactical Air Support Squadron) watched the progress of the C-130 and looked for AAA. As the C-130 passed over a grove of trees, the FAC saw the number three engine burst into flames. He called for the



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C-130 to break south and west. In the process the C-130 pilot dove the airplane from 1,000 feet to 400 feet to build up airspeed, and then he slowly eased the craft to a higher altitude.<sup>34</sup> After jettisoning the cargo, the pilot headed the C-130 due south with flaps burning and chunks of the wing streaking by the fuselage. With the right wing burning brightly and the controls frozen, the C-130 began rolling to the right, losing altitude. With his plane too crippled to reach any airstrip, the pilot decided to crash-land the craft in an open area in the jungle near Lai Khe. The plane hit the ground in a level attitude and slid to a stop in a marshy area covered with elephant grass. Within minutes the U.S. Army Air Cavalry helicopters had rescued the crew.<sup>35</sup>

(b) During the crash-landing, unsecured equipment and material in the cargo area hurled through the air, injuring the loadmasters. The 374th TAW took two actions to preclude or at least reduce the possibilities of similar injuries. First, the aircrews removed all unnecessary equipment from the cargo area, including such things as seats, chains, and tool boxes. Second, the crews requisitioned and developed "defensive" equipment to protect themselves against injury. For example, the loadmasters were in a particularly vulnerable position, especially while the aircraft was over the drop zones, and had to design protective equipment to enhance their safety. To that end, they placed garbage cans close enough to the static line so they could activate it from inside the cans; then they piled chains around the can. After making final checks prior to the airdrop, the loadmasters put on armored vests, wrapped flak vests

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[REDACTED]

around their legs, and then got into the cans. The loadmasters remained in their "forts" until completion of the drop and until the plane cleared the heavy AAA concentrations.<sup>36</sup>

(U) In the view of all concerned the low-level VNAF C-123 and USAF C-130 efforts were not satisfactory. Ground commanders complained that most drops were to the east of the drop zone, although much of the supplies were recoverable. The bravery of the crews was not questioned, but the combination of the systems used and the enemy weaponry greatly hindered the flow of supplies. From the USAF air commanders' point of view, the price of delivering the goods for those few days was too high--one airman killed, one aircraft destroyed, and four planes battle damaged. The VNAF lost two C-123s and many airmen during the same period of time. Thus, in an attempt to increase the flow of supplies and at the same time to provide maximum protection for crews and aircraft, the airlifters decided to use high altitude drops in lieu of the CDS deliveries.<sup>37</sup>

(U) Both VNAF and USAF were to participate in the high altitude air-drops. On the first day VNAF dropped 14 packs from 8,500 feet. Two landed inside the defense perimeter, three others were recoverable, and nine were lost to the enemy.<sup>38</sup> This poor showing was the result of marginal navigational accuracy on the part of the VNAF, coupled with parachute malfunctions. Drops from 6,000 feet on the following day fared a little better in that the friendly forces recovered a large percentage, but too much material drifted into the hands of the VC/NVA.<sup>39</sup>



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(S) The USAF method to reach the CARP was to use the Ground Radar Aerial Delivery System (GRADS). In the GRADS system the USAF MSQ-77 radar received a radar beacon target from a special beacon (SST 181X) mounted on the C-130. The on-board navigator computed the CARP for the mission. The radar track of the C-130 and its desired track to the CARP were entered into the computer associated with the MSQ-77 radar. The radar controller then vectored the C-130 on a corrected heading to the CARP where the load<sup>40</sup> was released.

(S) On 20 April the USAF C-130s flew their first high altitude GRADS missions at An Loc. The drop zone was 200 x 200 meters, substantially smaller than the recommended size of 1,300 x 200 yards. While the pallets were released at the proper moment, 8,000 feet above the defenders, only a few of the bundles hit the drop zone. Parachute malfunctions and improper rigging resulted in most of the supplies drifting outside the drop zone area. The Army ground command reported that of 26 tons of supplies dropped,<sup>41</sup> 24 tons landed in hostile territory and could not be recovered. On 21 April, drops were again unsuccessful. Intelligence sources reported that the VC/NVA were "counting on shortages of food and water" plus the presence of unevacuated wounded and unburied dead "to undermine ARVN morale" and render government forces "vulnerable to political warfare appeals calling on ARVN troops to desert." A U.S. Army officer reported that needed supplies<sup>42</sup> were in extremely short supply. On the following day the Senior U.S. Army Adviser to the ARVN 5th Division at An Loc reported that "the enemy enjoys observing no resupply. . . . Come hell or high water" supplies had to make<sup>43</sup> it through.



[REDACTED]

(U) Headquarters MACV, 7th AF, and the C-130 crews were as concerned as the ground command with the problems they were having in delivering the supplies. In an effort to solve the dilemma, the Commander of the 374th TAW had conducted a special experiment with the airdrops in addition to the regular resupply effort. He hoped that special observers might be able to visually spot and isolate the problem areas. Thus, a representative of the 374th TAW rode in the right seat of a FAC O-2. The special observer watched the C-130s make seven drops of one bundle each. Of the seven drops only two worked properly: two plummeted to the earth with chutes unopened and the remaining four opened prematurely at 5,000 feet, causing the bundles to drift away from the defenders. No simple solution could be deduced from these observations. The frustration of those involved in this experiment increased when recovery crews opened the two recovered bundles and found them loaded with low-priority sand.

(U) During this period, it was the Vietnamese who were packing and rigging the loads; the airlifters lamented that they were "only the dump truck drivers."<sup>44</sup> While what was put into the loads was easily remedied, the improper packing of the chutes was not. The unit responsible for the packing, the 90th ARVN Parachute Maintenance and Delivery (PMAD) team, did not have the technical expertise and essential ingredients required to make the system work: the ARVN had no experience in rigging for GRADS requirements; proper rigging materials did not exist in South Vietnam; and quality control procedures were not adequate. Thus, with little hope of immediate improvement in the GRADS attempt, the Air Force returned to the CDS resupply method on 24 April.<sup>45</sup>

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~~107~~ During the four days of high altitude drops, those responsible for aerial resupply to An Loc discovered that even high altitude streamers did not impact where expected according to the soccer field coordinates provided by the Army. In analyzing this problem, those concerned with the aerial resupply found that the VNAF and USAF aircraft that had received so much damage flying low-level had been directed to the wrong coordinates and thus to the wrong drop zone. There were <sup>46</sup>two fields near Highway 13 south of An Loc, one on each side of the road. Briefers for airdrop missions discussed the soccer field drop zone as if it were the only possible field to be seen. In reality, however, either field could pass visually for the field as briefed. One FAC who was directing airlift runs into An Loc said that on the first days "we didn't know exactly where the drop zone was."<sup>47</sup> Another FAC agreed, and confessed that on the first drops he directed he "didn't know what was going on."<sup>48</sup> Although the coordinates were wrong, no one could specifically identify which field was the soccer field and, therefore, the error was not discovered. Rather, the ground command complained that the drops were consistently east of the correct zone, and the Air Force tried to drop more carefully on the next occasion. Ironically, successful navigation guaranteed mission failure. Results, understandably, did not improve. After two days of these misdirected missions, an ARVN officer drew a hand overlay map and showed it to his unit's U.S. Army adviser. The map clearly indicated that the soccer field drop zone was actually west of the coordinates originally provided. As

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a result, two Army enlisted men appeared unannounced at MACV and delivered  
49  
the new coordinates on a piece of scratch paper.

(U) Desperation on the ground forced the Air Force to return to the CDS resupply at An Loc. To support the 20,000 plus people besieged at An Loc, the ground command established initial daily supply requirements at 200 tons. This figure included 140 tons of ammunition, seven tons of dehydrated and bagged rice, 29 tons of other foodstuffs, 20 tons (4,800 gallons) of water, two tons of MOGAS, and two tons of medical supplies. Because of the low delivery and recovery rates, priorities had to be established for the pallet loads. At first, highest priority went to small arms ammunition and 105mm shells, but after the NVA destroyed the ARVN 105mm weapons with counter-battery fire, this requirement ceased to exist. Discovery of a brackish, but usable, water source within the  
50  
defense perimeter eliminated the water requirement also. Experience proved the 200 tons to be "excessive" and the town was able to survive on less than one-third of the amount originally projected. During the days of high altitude drops, however, even this bare minimum was rarely met. Hopefully, the CDS supply would more than meet these minimums. To reduce the dangers to aircrews and aircraft while they tried to resupply An Loc,  
51  
the reinstated CDS missions were all scheduled for hours of darkness.

(U) Although the night program appeared to be a viable alternative to the day program, it was not. New problems peculiar to night missions were added to most of the problems encountered during the daylight flights.

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Crews had minimum night training before they arrived in the Far East, and received no such training at the 374th's home base in Taiwan because the host government forbade any night practice drops. The few night airdrops the crews had made at other places (e.g., Okinawa) were insufficient for proficiency. "More than once," just prior to takeoff for a night CDS mission, the navigator briefer "was explaining basic doppler techniques to the navigator and the pilot briefer was talking basic crew coordination problems."<sup>52</sup>

~~(S)~~ On the night of 24/25 April, with all lights extinguished except for topside formation lights, seven C-130s flew to An Loc to deliver supplies to the defenders. With knowledge of the proper coordinates for the CARP, and having the element of surprise because low-level missions had not been flown recently, all seven aircraft completed their drops successfully, although they sustained some battle damage. Major General Hollingsworth reported that the drops seemed to have had a "fair degree" of accuracy, but actual recoveries had not been reported. The General did mention, however, that he preferred day drops because the task of ground recovery teams was much easier in daylight.<sup>53</sup>

~~(S)~~ On the second night of the new series of drops, four of 11 missions crossed the drop zone through AAA fire heavier than before. At least two of the four drops were on target, but the NVA gunners were on target as well. One C-130, hit by ground fire, plummeted to the earth two kilometers southwest of An Loc with the loss of the entire crew.<sup>54</sup>

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The following night, 10 scheduled heavy drops were cancelled by weather. At this time, however, the 374th TAW was directed to "fly a daylight 10 ship low level mission with fighter escort" to An Loc. All planes were to come in at the same heading at one-minute intervals. Personnel from the airlift wing did not concur with the proposed plan, and attempts were made to have the directive cancelled.<sup>55</sup> Although the origin of this plan was not known to the operating elements, the commander of the 374th TAW stated that mass formation airdrop demonstrations (e.g., BRASS STRIKE and BRAVE SHIELD given to joint service groups in the United States) may have suggested the idea. On such occasions, the mass formation drops were always successful--but they were never intended to be used in a high-threat area such as An Loc. The FAC scheduled to be on station for the 10-ship mission considered such tactics to be so dangerous that he planned to launch search and rescue aircraft prior to the start of the mission. Fortunately, such an action was not necessary, since the mass formation was cancelled less than 24 hours before it was to have begun. With the mass formation drop no longer an issue, emphasis again shifted to coping with the many problems encountered with the night CDS deliveries.<sup>56</sup>

(C) In order to reduce battle damage to the C-130s, airlift managers and FACs attempted to find ways to suppress the AAA and ground fire along the tracks into the drop zone. Intensity of fire gradually increased as the planes approached the drop zone and was most concentrated at that point. It was virtually impossible to surprise the enemy gunners at the destination. In the view of many FACs, the VC/NVA had ground observers who called



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to their forward AAA when a C-130 passed overhead. After the second observer called in, the AAA operators knew the heading because once a run-in began, the C-130s did not change their headings. (Interestingly, the NVA 7th Division Command Post was located on a principal run-in heading south of An Loc.) In the final analysis, however, no matter what the run-in heading, all C-130s had to drop at the same place.<sup>57</sup>

(C) All AAA was dangerous, but the pilots were most concerned about the 23mm AAA because of its rapid rate of fire and high degree of maneuverability.<sup>58</sup> If the guns could be spotted, which was extremely difficult, FACs found the 8th Special Operations Squadron (SOS) A-37s most useful against the guns because of their long loiter time and great accuracy. Additionally, AC-130 gunships were used to silence gun positions on occasion. While known positions could be struck prior to runs, all these actions had only marginal success, and AAA remained intense. Furthermore, small arms fire, which could be effective against the low-flying C-130s,<sup>59</sup> was almost impossible to suppress. The VC/NVA knew the resupply runs<sup>60</sup> were coming; they had only to watch and wait.

(C) Another problem not completely resolved was the coordination of the CDS runs among FACs, C-130s, and ground elements. Initially no one had experience in the situation that existed at An Loc, so timing among the participants was crude at best.<sup>61</sup> Once timing was improved, the FACs had the problem of how to inform the ground teams about the timing and nature of the coming drop without a security compromise. Principal

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communication was through FM radios, with the FAC the central point of contact. On some occasions, FACs had problems contacting C-130s equipped with PRC-26 FM radios. (To use this radio, an aircrew member had to remove his protective helmet, which was seldom done on low level runs.)<sup>62</sup> After determining the information required by the ground recovery team, the FAC called out a five- and then a one-minute warning. Since the C-130 pilots felt this contributed to increased AAA, the FACs soon terminated this practice. Next, the FACs used codewords, but these were not always effective. The Army complained that often "warnings came too early, and the spotters, who were posted to locate falling bundles at night would tire of their vigil" or the warnings "came at the last minute." Finally, the FACs did not warn the ground commander precisely when a drop could be expected. While the information may not have been "essential," this lack<sup>63</sup> of knowledge made ground recovery more difficult.

(c) On night low level missions, the soccer field was very difficult to see and much effort was expended to mark it more clearly. The first night the ground crew did not mark the zone and the FACs and airlift crews looked for the field by the flickering light of the burning town. For the first few days the pilots could see the edges of the trees in the rubber plantations that marked the approach to the drop zone. There was very little contrast and a pilot had to look for differences in shading. As one FAC stated, it was like "a pencil drawing in black and brown." Dropping flares was a quick solution, but FACs did so with concern. While

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the flares illuminated the field, they also put the FACs and C-130s in  
perfect silhouette, making the AAA even more dangerous.<sup>64</sup>

(C) More desirable than dropping flares were flares and markers laid out in a precise pattern by ground recovery teams. Ground personnel filled #10 cans with dirt and MOGAS, a mixture which provided about 10 minutes of burn time. With the standard C-130 run-in time of six to eight minutes, ground crews had to know when the C-130 run was about to begin in order to ignite the markers. When communications security made such notification impossible, this method of marking the field was discarded.<sup>65</sup>

(C) Shortly thereafter, the USAF dropped portable runway markers to the ARVN defenders. They placed these markers in an "X" on the northern end and in a "T" on the desired impact point. These lights "proved ineffective because of the confusion with the many other fires and other lights in the area." A radar beacon to supplement the illumination proved ineffective because the C-130s run-in altitude was often too low for beacon acquisition.<sup>66</sup> (See Figures 3 and 4.)

(C) Another method of lighting the drop zone was an innovation developed in actual combat. FACs had found the AC-130 Spectre's 2 kilowatt (KW) light, with the infrared filter removed, useful to mark targets when flares were not available. Effective 25 April, the Spectres began to use this capability to illuminate the drop zone for their sister aircraft. The Spectre orbited the drop zone and when the C-130 was approximately four miles from the release point, the AC-130 crew turned on the 2KW light. The C-130 would then make final corrections using the light as a reference.

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Just prior to the C-130's entry into the cone of the light, the Spectre would turn off the light and the C-130 made the drop in darkness. The AC-119 Stinger gunship was used in this same illuminating role also. The 2KW light and the 10 minute MOGAS "lamps" elicited the same reaction from the VC/NVA--the AAA crews readied their weapons and the NVA artillery and mortars zeroed in on the drop zone. To try to reduce this, gunship crews were instructed to use the light periodically during the mission. The 2KW light worked well from the airlift point of view, but it attracted AAA to the gunship. Additionally, using the gunships in this role removed<sup>67</sup> these aircraft from their primary missions.

(S) During the interval between the loss of the second C-130 and the third C-130 on 3 May, the aerial resupply of An Loc was not sufficient to support the ground commander. On 1 May Major General Hollingsworth reported to General Creighton W. Abrams, Commander, MACV, that of the total tonnage dropped "less than 30 percent" was "recoverable by friendly forces." A review of VNAF efforts since 15 April had revealed that they had been "even less<sup>68</sup> successful." On the night of 2 May seven heavy drops were scheduled into An Loc. The first CDS drop was made 700 meters to the southwest of the drop zone. In General Hollingsworth's words, the system seemed "to be going from bad to worse." The remaining six drops were cancelled in<sup>69</sup> the hope that an improved system could be found. The following day the C-130s returned again to An Loc. Shortly before midnight, one of these C-130s apparently hit the trees on the ridge east of An Loc and cart-wheeled. One FAC on station at the time did not see ground fire, but no



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Drop Zone for Aerial Resupply  
27 Apr-4 May 72

FIGURE 4

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conclusive proof existed as to why the plane hit the ridge--it could have been hit by ground fire. Whatever the cause, the result was the the same--<sup>70</sup> loss of a C-130 and its entire crew. After the crash, all further low level missions into An Loc were cancelled. At that time, the Army felt that "the enemy benefitted far more from the resupply than did our own people" and that it was wise to cancel aerial resupply until a better<sup>71</sup> system could be developed.

~~(S)~~ While the USAF was not prepared to cancel aerial resupply into An Loc, it was ready to cancel further CDS missions. The airlift report completed by the Seventh Air Force Airlift section termed the results of the CDS "unacceptable." Not only did the ground command report that the enemy was receiving the major part of the goods, but also USAF losses were too high in relationship to what was being achieved. More than half of the missions flown resulted in battle damage to the C-130s. Three aircraft were lost, 37 were damaged, and 15 fatalities were incurred. It had become<sup>72</sup> "mandatory to find a new tactic."

~~(S)~~ The experience at An Loc was mirrored in the USAF attempts to supply two other besieged locations through the CDS method. At Kampong Trach in Cambodia, elements of two NVA regiments surrounded three ARVN Ranger battalions and two scout companies. As at An Loc, NVA artillery quickly silenced all ARVN heavy guns. Initial VNAF attempts at aerial<sup>73</sup> resupply by C-123s resulted in 80 percent recovery by the enemy forces. On 24 April the first USAF C-130 CDS mission was flown into Kampong Trach. While the mission was successful, the C-130 sustained 60 hits. (The crew

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of this very aircraft was killed the following day at An Loc.) Remaining drops for that day were cancelled. After further damage occurred the following day, the USAF changed to night CDS missions and delivered many supplies. Of the 11 aircraft that flew over Kampong Trach, however, five were seriously damaged. At Landing Zone English in MR II in South Vietnam, the C-130s flew five CDS resupply missions before the position fell on 3 May.<sup>74</sup>

(4) From the beginning of the offensive until 3 May, VNAF and USAF aerial resupply was only marginally successful. While many supplies reached government forces and helped them hold their positions, the Army ground command estimated that as much as 567 tons of supplies had reached enemy hands at An Loc alone. Whether that much had actually been lost to the hostile forces was questionable, but all concerned felt that the existing methods of aerial resupply were inadequate. Unless the Air Force could find a solution, the besieged positions would fall to the enemy.<sup>75</sup>



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## CHAPTER II

### HIGH ALTITUDE AIRDROP: FRUSTRATION AND SUCCESS

(U) The conception of parachutes laden with supplies and reinforcements drifting to besieged defenders was popularized in war films, and so had a romantic charm that the CDS technique never acquired. Now that the CDS method had proven too dangerous at An Loc and Kampong Trach, the idea of parachutes drifting peacefully to defenders had an operational charm as well. If the supplies could be delivered accurately from altitudes above AAA fire, the besieged at many locations could be saved with minimum risk to C-130s and aircrews.

(S) As recounted briefly, above, the high altitude drops at An Loc between 19 and 23 April had shown some promise, even though the actual results were poor. Ballistics information available for computing the CARP was not directly applicable to the situation at An Loc and it was only through chance that any was available at all. Major Highley of the 374th TAW had been associated with an Adverse Weather Aerial Delivery System (AWADS) test program on his previous tour of duty. Because he had worked with the program, he received a courtesy copy of the final report which contained some ballistics data. By using this report Major Highley converted available tables to get ballistics information ready for the An Loc GRADS attempt.  
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(U) Because the CARP could "not be reliably determined" by navigational equipment aboard the C-130s, the USAF decided to use the MSQ-77

"SKYSPOT" radar system to guide the C-130s to the CARP. This system performed well, and was the most successful facet of the five day GRADS attempt. If the C-130 navigator provided an accurate CARP to the MSQ-77 system and it in turn guided the C-130 to the CARP precisely, the C-130 aircrews could hit the drop zone with a fair assurance of success if the delivery system worked as designed. Unfortunately, this was not to be the case. <sup>77</sup>

~~(b)~~ Because information was not available in Army manuals on methods of rigging bundles for airdrops from high altitudes, the U.S. Army advisers and the 90th PMAD worked out a possible solution locally. Standard CDS loads with the low rate of descent of 25-30 feet per second would cause excessive drift and make it impossible to hit the small drop zone at An Loc. The solution was to delay the opening of the G-12D parachute with a tie around the skirt hesitator. (The skirt hesitator was a piece of webbing strapped around the skirt of the G-12D canopy just above the suspension lines.) While the hesitator was in place the canopy was delayed in opening. After a preset time, a time-delay cutter severed the cord <sup>78</sup> holding the hesitator, allowing full deployment of the parachute.

~~(b)~~ The drop results on the first day were "poor," and little improvement was noted over the next four days. One FAC present during the first day's drop noted that with the exception of providing AAA warnings, the FAC's chief responsibility during C-130 airdrops was to watch for the parachutes and to guide recovery teams to them. He stated that during these airdrop attempts some chutes never opened and supplies smashed into the ground, often rendering them completely unusable. Others



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inexplicably never left the plane. A great many of the parachutes opened too early, and a few drifted as far as four miles from the drop zone, taking almost 10 minutes to reach the ground.<sup>79</sup> The parachute riggers determined that these chutes opened early because the cord used to tie the skirt hesitator was too thin and broke quickly, thereby deploying the parachute too early. When nylon webbing was substituted for the cord, the cutter could not slice through it and the percentage of streamers increased. The 90th PMAD used light green parachutes at first, but when FACs reported that they had trouble spotting them against the ground, white ones were substituted.<sup>80</sup> Another factor contributing to the poor drop results was that no wind information was available for the area directly over the drop zone. The only wind information came from Bien Hoa, and it was usually over six hours old.<sup>81</sup>

~~(S)~~ The VNAF experienced the same kinds of problems with their parachutes that the USAF had. In addition, the VNAF used makeshift bomb sights at 6,000 feet to hit the drop zone and in the words of the Tactical Air Command Liaison Officer, they were "not consistently accurate."<sup>82</sup>\*

~~(S)~~ Between 19 and 23 April, the preparation portion of aerial resupply had to expand rapidly to match increased ground and mission requirements. The packing and rigging at the 90th PMAD unit (located at Camp Bac Binh Vuong) and the loading of transports at Tan Son Nhut Air Base began a full 24-hour operation. Headquarters MACV requested assistance from the 549th Quartermaster Company (Aerial Delivery) [QM Co. (AD)] at Okinawa, and on 22 April two officers and four enlisted personnel from that company arrived in Saigon to provide advisory support. Noting that manpower

\*See pages 36 and 37, below.

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and experience levels were low, the advisory team requested its parent unit to send additional personnel to Tan Son Nhut AB on temporary duty. <sup>83</sup>

(C) Although 7AF had decided to return to the CDS low level missions on 24 April, U.S. Army and USAF personnel continued to work on the high altitude drop program. On the same day that the CDS missions resumed, an additional 70 personnel arrived from the 549th QM Co. (AD) to augment the 90th PMAD. Two days later, these personnel were rigging loads at the hot pad area at Tan Son Nhut AB. To improve the overall support for the airlifters, this group organized a rigging area, started a consolidated supply system, set up improved quality control, supervised the rigging of 100 tons of supplies per day, and packed all parachutes. <sup>84</sup> At the same time, five Air Force quality control personnel from Taiwan arrived and began working around-the-clock shifts to ensure that the ARVN followed the new procedures. In addition, assistance was requested from the Tactical Air Command (TAC). In response to this request, an officer and a non-commissioned officer arrived within a week. <sup>85</sup>

(C) The basic problem confronting the 549th QM Co. (AD) was that the services had very limited experience with precision high altitude drop techniques. Attempts to develop new methods in the field were hampered by the lack of hardware and the lack of experience of VNAF personnel with complex rigging procedures. At this juncture, Major Highley delivered his copy of the AWADS final report to the 90th PMAD advisers and the 549th QM Co. (AD). This report described a high altitude, low opening (HALO) air delivery system which the packers and riggers took immediate steps to implement. <sup>86</sup>



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~~(S)~~ The Confined Ballistic System (CBS) HALO technique was more sophisticated than the locally-developed HALO system, but the USAF had the hardware and experience to support the CBS technique. In this system, the G-12D parachute was packed with a 142-inch reefing line "threaded through one inch diameter metal rings placed on each suspension line with a girth hitch just below the parachute skirt." As the parachute left the C-130, the reefing line allowed the parachute to only partially fill with air as it descended at approximately 130 feet per second toward the drop zone. When the cutter activated, it severed the reefing line, allowing the parachute to fully deploy at an altitude of (ideally) 500 feet. The descent of the load with the chute fully deployed then slowed to approximately 26 feet per second. Thus, the availability of particular CBS cutters determined the altitude of the C-130. A 30-second delay cutter provided a drop altitude of 5,700 feet, and a 50-second delay cutter required an altitude of 8,600.<sup>87</sup>

~~(S)~~ Using the CBS cutters the USAF began a new series of tests at the Hoc Mon drop zone near Saigon. On this occasion the American riggers used heavier reefing lines to keep the lines from breaking and so causing the chute to fully deploy too early. The line proved to be too tough for the cutters, however, and five of the eight bundles impacted with chutes unopened. Nevertheless, the test led to some cautious optimism<sup>88</sup> because all bundles were within a 200 yard radius of the drop zone.

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(S) On 3 May, the decision was made to halt low-level missions and to return, once again, to high altitude drops. By this time "the people [at An Loc and other besieged areas] were very dejected because of their inability to receive adequate supplies." The food situation was "very dire."<sup>89</sup> On the other hand, enemy forces were pleased with the wayward bundles that fell into their hands. One Viet Cong officer, captured on the east side of An Loc, asked his captors for some fruit cocktail. He explained that he had become accustomed to eating it since some American airdrops had been recovered by his unit. One U.S. Army officer who was present--and whose normal sustenance was brackish water, canned fish, and rice--found the scene "very depressing."<sup>90</sup>

(S) On 4 May the USAF resumed high altitude airdrops. At Minh Thanh, some 300 ARVN troops and civilians were surrounded and food supplies were almost exhausted. On the first series of drops, supplies landed from one to two kilometers from the hamlet. On the next series, the USAF released 11 bundles over Minh Thanh. Ten of these bundles landed outside of the defense perimeter. In attempting to retrieve the bundles, the ARVN suffered six casualties.<sup>91</sup> At An Loc the results were somewhat better, but not as good as anticipated. Dropping from altitudes varying from 6,000 to 9,000 feet, the C-130s dropped parachutes bearing 24 bundles--12 performed well, nine failed to open and crashed in, and three opened prematurely. Nevertheless, all but one were recovered. On the following day, 88 tons were dropped, of which the ARVN recovered only 46 tons intact. Still, Major



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General Hollingsworth noted optimistically that "most of the supplies did land inside the perimeter." On 6 May the general reported that of 80 bundles dropped, 74 landed inside the defensive perimeter although 32<sup>92</sup> landed hard.

(c) On 6 May the two newly arrived Tactical Air Command TDY personnel were inspecting rigging operations and found that the reefing lines were too short for HALO-rigged loads. That same day Major General Hollingsworth noted that 32 parachutes did not open properly or were streamers. U.S. Army advisers to the ARVN 5th Division inspected the chutes after they hit the ground. They found that the cutters had fired, but "it appeared that the chutes just were not rigged properly" and that this precluded a normal opening.<sup>93</sup> This information and their own inspection led the two TAC personnel to conclude that the short lines had caused the major portion of the malfunctions. Normal HALO procedures dictated reefing lines of 142 inches, the length necessary to allow the chute to partially fill with air. The experts found some lines to be as short as 70 inches and none to be longer than 130 inches. This resulted in chutes streaming because they filled with air too slowly or descended erratically, making it impossible for them to open properly. The riggers replaced all the short lines with those of the required length and corrected some minor discrepancies as well. Quality control personnel then paid special attention to these problem areas. Finally, to provide better overall management and quality control of the entire rigging and packing operation, 90th PMAD was moved<sup>94</sup> to join the 549th QM Co. (AD) at Tan Son Nhut AB.

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With the packing and rigging situation steadily improving, the USAF acted to control another problem discovered during previous air-drops. The Seventh Air Force directed that AC-130 Spectre gunships assume the task of providing more accurate wind information over the drop zone at An Loc to C-130 crews. To do this, the Spectre fired its guns against truck hulks along Highway 13 near the drop zone. Its on-board computer then calibrated the difference between where the round should have struck with where it did strike. From this figure the computer was able to provide the "mean wind reading from altitude to ground level." The Spectre crew passed this information to the C-130 navigator who used the data<sup>95</sup> to make corrections on his own CARP computations.

(C) In another measure instituted to improve the overall results, the USAF had all missions employ a split bundle technique to allow the navigator to make additional corrections for the largest part of the load. One FAC and a ground commander had suggested to the airlifters that two test bundles be dropped on the first run by the C-130. Then, 10 to 15 minutes later, after making corrections based on the first two bundles, the same C-130 would drop the remainder of its bundles. The C-130 command adopted the idea, but four bundles were used instead of two for the test drops because of problems in properly securing the bundles in the cargo compartment. In retrospect, one C-130 navigator noted that the small size of the drop zones almost dictated a split bundle technique to restrict the dispersal pattern of the bundles to a minimum radius.<sup>96</sup> The system worked



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well. The FAC would observe the test run and would pass corrections in meters to the C-130 such as "north 100, west 200." Results on the second run-in were usually considerably improved. After this program went into effect some four-bundle drops were lost, but never the entire load. <sup>97</sup>

(c) The airdrop record on 7 May continued to show improvement; however, streamers continued and one new problem arose. Of 88 tons dropped on that date, only one ton fell outside of the defense perimeter, but 19 tons were destroyed against the ground by malfunctioning parachutes. <sup>98</sup> Beginning 8 May, in a further effort to reduce the number of streamers, the 90th PMAD placed a 20-foot sling between the parachute and the load to give the chute a better chance to fill with air. The most serious discovery on 7 May, however, was that the supply of 50-second CBS cutters had dwindled to 175. A quick check revealed that the cutters were available from only one company and that it would take 35 days for 100 cutters to reach the theater and 60 days to secure an additional 1,000. These delivery dates were completely unacceptable considering the situation on the ground; nevertheless, the Army placed an order. On 13 May the entire supply of 50-second CBS cutters in SEA was exhausted. <sup>99</sup>

(c) In the meantime an event in MR I was to compound the already complex airdrop problem. On 2 May General John W. Vogt, Commander of 7AF, reported to Chief of Staff General John D. Ryan that an SA-7 (Strella) heat-seeking missile had been fired at a USAF aircraft. "The implications for low altitude C-130 deliveries," he pointed out, "were obvious." <sup>100</sup> With the C-130s forced above 10,000 feet by the introduction of the SA-7,

the NVA had issued a new challenge to "Yankee ingenuity." If there had been any question before as to whether to resume low-level deliveries, the SA-7 introduction precluded further debate.

~~(S)~~ The only CBS cutters then available for the HALO technique were of the 30-second variety, dictating an unacceptably low airdrop altitude of 5,700 feet. Sixty-second cutters that would allow the C-130s to drop from altitudes of over 10,000 feet were ordered but would not arrive until late August.<sup>101</sup>

~~(S)~~ The 94 percent success rate of airdrops over An Loc between 4 and 9 May had suddenly become history. With the methods which had so recently proven successful now either obsolete or inoperable because proper equipment was not available, USAF and Army personnel decided to try a new high velocity, high altitude drop system.<sup>102</sup> The high velocity method used a parachute resembling an aircraft drogue chute to stabilize the bundle during high velocity descent. The ideal method was to use a 200-foot slot ring parachute on a 2,000 pound load. This resulted in the load impacting the ground at 105 feet per second.<sup>103</sup> As in earlier attempts to improve airdrop reliability, little information existed on rigging high velocity loads and "no one" at Tan Son Nhut AB "had ever rigged high velocity chutes."<sup>104</sup>

~~(S)~~ On 8 May, Seventh Air Force scheduled four test missions over An Loc using the high velocity technique. The accuracy of the bundles restrained by the 22-foot chutes was good--all 22 tons hit the drop zone.<sup>105</sup> Part of this mission was to test the survivability of cargo hitting the



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ground at such a high rate of speed even with honeycomb material cushioning the impact. Boxed rice was fully recoverable, while 90 percent of bagged rice was spilled over the drop zone. About half the cans of fruit ruptured, but the hungry defenders consumed the fruit in the damaged containers immediately. Drums of fuel pancaked, resulting in a total loss of the fuel on the drops. Small arms ammunition (M-16 and M-60) survived the drop in good condition. <sup>106</sup>

~~(S)~~ The high velocity drops and CBS HALO airdrops continued to have good results during the next few days. When both methods were used on a single C-130, the aircrew made separate runs for each type of drop to preclude tangling the parachutes. <sup>107</sup> On 9 May, Major General Hollingsworth reported that 79 tons of supplies reached friendly hands. On 11 May he reported to General Creighton Abrams that ARVN ground forces at An Loc had recovered 63 tons of needed supplies. "This represents," he said, "a 90 percent effectiveness rate and a significant improvement over past drops." <sup>108</sup> The rapidly increasing effectiveness of the airlifters did not go unnoticed by the VC/NVA troops around the city. Sustaining a general decline in combat capability because of the thousands of sorties flown against them, the VC/NVA saw the military implications of an effective aerial resupply of the defenders. Thus, on 11 May, the VC/NVA launched an attack on An Loc, but the combined Allied airpower met them with more than equal force. By 16 May the massive air effort had crushed the attacks, and the VC/NVA attempts to take An Loc came to an end. <sup>109</sup>

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(U) Principally responsible for the increased effectiveness of aerial resupply at An Loc was the high velocity airdrop technique. The U.S. Army advisers on the ground were unanimous in praise of the system, which was noteworthy for its accuracy. After the first three weeks of use, the American advisers to the 5th ARVN Division reported that 97 percent of all high velocity drops landed on the drop zone. Further, the normal linear dispersal of 16 bundles on a good drop was within an area of 150 meters x 50 meters. In some cases, the area had been as small as 75 x 50 meters.  
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(✓) The limited dispersal of bundles proved a boon to the ARVN recovery forces, and also had an important psychological impact on the besieged at An Loc. ARVN troops had been reluctant to pursue bundles beyond their defense perimeter, a problem considering that even when on target, some HALO bundles drifted a small distance outside the perimeter. If a high velocity drop was on target, all bundles arrived within the perimeter, an achievement which accounted for the greatly improved recovery rate. Limited dispersal of the bundles also speeded up the recovery process.

(✓) The NVA artillery ordinarily began shelling the drop zones 10 to 15 minutes after an airdrop. The more quickly the ARVN could recover the bundles, the less chance the NVA had to destroy the supplies. By 1 June the ARVN were able to retrieve the resupply from the drop zone in a phenomenal 90 seconds.  
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Earlier, because of the paucity of supplies and because "people were actually starving," people picked up supplies



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they found after airdrops and refused to turn them in to a central authority for distribution. In some cases armed civilians drove off ARVN soldiers with automatic weapons. When the besieged at An Loc saw supplies arriving regularly, they placed confidence in the brigade commander to distribute them, and conditions improved rapidly. As a fringe benefit, recovery statistics improved more than expected because the practice of individuals hiding what had been actually recovered was gradually abandoned as supply levels increased.

(C) The principal problems with the high velocity system stemmed from parachutes that malfunctioned, thereby destroying loads and occasionally demolishing items on the ground that were struck by the falling bundles. Fortunately, parachute malfunctions in this system were far fewer than those experienced by other modes during the offensive. For example, 59 percent of the time-fused HALO parachutes malfunctioned as compared to 7 percent in the high velocity drops. When a high velocity chute did malfunction, however, it tended to cause others to fail as well. Since the 16 bundles were dropped in rapid succession, the faster-falling malfunctioning bundle sometimes tore through other descending loads causing mass disintegration. Even if it did not strike other chutes, the high velocity malfunction could cause damage on the ground. On one occasion at An Loc a ton of canned peaches scored a direct hit on a jeep, completely destroying it, creating a peach "shortjeep."

(C) The loads most vulnerable to malfunctions in the high velocity technique were those containing medical supplies and high explosives.

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(During the early phase of the resupply effort at An Loc, one VNAF helicopter crew delivered whole blood by kicking it off the craft "that was flying at better than 30 knots and at 50 feet.")<sup>114</sup> Even with almost infinite care, medical supplies did not fare well. "Serious shortages" were common and units went for days without receiving any usable medical supplies.<sup>115</sup> "Usually" the supplies were unusable after impact even on good drops. The "consensus was that air dropping of medical supplies, even though the need was most urgent, was not a practical method." Of the several tons sent to An Loc, "only a small fraction reached medical personnel."<sup>116</sup>

(U) Problems with high explosives occurred when chutes bearing 81mm mortar ammunition malfunctioned. On four occasions between 12 and 30 May, ammunition exploded on impact causing sympathetic detonations lasting up to five hours.<sup>117</sup>

~~(S)~~ When the USAF and the United States Army (USA) developed successful techniques such as the high velocity system, they trained VNAF personnel in the systems as part of the Vietnamization program. The North Vietnamese AAA had driven the VNAF to high altitudes as they had the USAF, but the VNAF had only makeshift--and inaccurate--bombsights to use at high altitudes. Nevertheless, the Air Force Advisory Group arranged for the 374th TAW to train six select VNAF C-123 crews in the GRADS/high velocity techniques.<sup>118</sup> On 13 May the program began with VNAF crews dropping from 9,500 feet. (They did not have proper oxygen equipment available to go over 10,000 feet.) During the six-day program



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the crews made 10 drops, achieving a circular error average of 95 meters. From that point onward, the VNAF integrated the six qualified crews with students on all missions to expedite training.<sup>119</sup> On 27 May the VNAF flew its first combat GRADS/high velocity airdrops, and within a week had successfully delivered 32 tons of supplies to various areas under siege, with all bundles falling in designated drop zones.<sup>120</sup>

(b) One technical problem arising in the VNAF adoption of GRADS was quickly solved. Because the VNAF C-123s did not have beacons, the MSQ-77 radar lost contact with them, occasionally aborting a mission or resulting in a poor airdrop. The VNAF designed a modification so that the SST-181X beacon could be mounted on the C-123 in place of the belly anti-collision light. The VNAF maintenance teams could install the beacon in 30 minutes, and the beacon could provide accuracy within 100 meters of the desired impact point.<sup>121</sup> Once the beacons were installed, the Air Force Advisory Group requested that MACV give VNAF first priority in scheduling missions to upgrade its aircrews as quickly as possible.<sup>122</sup>

(c) At the same time the USAF was giving VNAF upgrade training on the GRADS technique, the Air Force was planning an operational evaluation of the Adverse Weather Aerial Delivery System (AWADS). Basically, the system is designed to assist aircrews in making airdrops in low visibility or total darkness. The equipment includes a multi-function forward-looking radar, the AN/APQ-122(V), coupled with a navigational computer, the AN-24 (V), to provide automatic CARP computations and guidance to CARP. It also includes station keeping radar, the AN/APN-169A,

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designed to keep the C-130s separated in flight. During preflight planning, several flight parameters (e.g., parachute characteristics, location of drop zone, impact point, drop zone heading, and offset aim point location) are entered into the computer. The navigator uses these parameters to make course computations in flight. Once airborne, the computer subsystem supplies all information to pilot and navigator. To update the computer, the navigator moves an electronic cursor on his display. Once the cursor is placed at a particular position on the scope, the computer will calculate the correct track with respect to the landmark fix. When the aircraft approaches the drop zone, the navigator places the electronic cursor on the preselected offset aim point, usually a geographic feature. At this point the computer determines the CARP from the parameters previously stored in its memory and from the actual flight conditions encountered. When the CARP is reached, the computer signals the aircrews to drop the load.<sup>123</sup>

On 21 and 24 May, the USAF deployed part of the 61st Tactical Airlift Squadron (TAS) to conduct the operational evaluation of the AWADS. On 1 June the 61st TAS made the first AWADS drop over Svay Rieng, Cambodia. (This drop was verified by GRADS procedures.) All 16 bundles hit the drop zone. Two days later, C-130s made successful AWADS drops at Kontum. On 15 July, upon completion of the evaluation, the 61st TAS reported excellent results overall in spite of problems encountered using the system in Southeast Asia.<sup>124</sup>



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(S) The success achieved by the AWADS during the offensive was more a testimony to the aircrews and those associated with airlift in MACV and 7AF than with the system itself. Prior to the deployment of the 61st TAS to conduct the evaluation, only two of its 20 aircrews had any high altitude training and none had flown the 11,000 foot altitude required for most of the AWADS drops made during the evaluation. Proper charts to established offset points were not always available, and errors as great as 250 meters existed on some charts available in the theater. Where natural offset points could not be located, photography was used instead. The method used to update the rate of fall in the AWADS computer was a low altitude approximation which resulted in significant rates of error for high altitude airdrops. To solve this problem, the navigator had to make manual computations before making certain entries into the computer. As a final problem, the computer was not programmed to do all the ballistic wind computations required. In short, the evaluation concluded that "corrective action" on these problems had to be accomplished to ensure "success of AWADS on a world-wide employment."<sup>125</sup> As far as local results were concerned, AWADS had a success rate similar to the GRADS techniques already in existence.<sup>126</sup>

(S) Because of the large volume of airdrops being made at An Loc, most of the innovations and new systems received their major testing there. Not all of the airlift experience gained at An Loc, however, was easily transferable to other besieged areas. Different types of terrain around

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other zones affected atmospheric conditions that changed air density. Loads dropped at locations at higher altitudes (such as Kontum) fell through air of a different density than that found at lower altitudes. These conditions required that specialized ballistics information be available for each new drop location. Because such information was not always available, systems of averaging were used that were not always precise. Even though differences might be small, even small errors caused loads to miss the minimum-sized drop zones. (See Appendix 3.) Accurate wind information was another problem. If ground conditions permitted, the C-130s could climb to the release altitude near the drop zones and take wind readings every 1,000 feet. After the introduction of the SA-7, however, this was rarely possible. If a Spectre AC-130 was over the drop zone, it could provide accurate ballistic wind information, but AC-130s were seldom available due to higher priority commitments. Thus, wind and weather information often came from areas distant from the drop zone. This was highly significant, for one knot of wind error caused "the load to drift 50 meters off target when using high velocity chutes."<sup>127</sup>

~~(S)~~ Nevertheless, despite the difficulties, the C-130s made many successful drops at remote outposts and small towns. At the Dak Pek Border Ranger Camp, located north of Kontum on Highway 14, VC/NVA forces were exerting heavy pressure on the surrounded defenders. On 13 May the USAF successfully delivered 14 of 16 bundles to the besieged friendlies in unfavorable weather and with spotty communications. John Paul Vann, Senior U.S. Adviser to MR III, was most pleased with the results and

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gave "high praise" to the USAF for the successful delivery under trying conditions. This airdrop was considered a "key factor" in enabling the defenders to hold their position.<sup>128</sup>

(S) In the closing days of May and through the middle of June, the major portion of the airdrop workload shifted from An Loc to Kontum. Throughout May the VC/NVA had steadily increased the pressure against the runway at Kontum. On 16 May two VNAF C-123 transports were hit by NVA artillery and were destroyed. On 17 May the NVA gunners damaged two U.S. Army Cobra helicopters, and when a USAF C-130 carrying ammunition crashed on takeoff while attempting to avoid enemy fire, 3,000 rounds of 105mm howitzer ammunition exploded, destroying the C-130.<sup>129</sup> Effective the night of 18/19 May, the 7AF allowed landings at the pilots' discretion, but small arms fire frequently drove off flights. That same evening a C-130 (Spare 622) blew a tire and broke a hydraulic line. In the morning the NVA shelled the airstrip, setting the disabled C-130 afire and so destroying it. On 21 May, 14 rounds of 122mm rockets struck the airfield. One VNAF C-123 was hit while landing. Although the crew escaped,<sup>130</sup> the aircraft and cargo were destroyed. On the night of 24/25 May, sapper units penetrated to the eastern edge of the runway, closing the airstrip to all fixed wing aircraft. With mainforce VC/NVA elements attacking the city from the north and southeast, CH-47s began flying in supplies to a soccer field west of the city, and the USAF began plans for airdrop resupply.<sup>131</sup> General Vogt pointed out that with Kontum Pass still closed, supplies had to go in by airdrop. In comparison to An Loc, the

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population of Kontum was much larger, and so a greater airlift effort was  
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required.

(4) Lessons learned at An Loc aided the resupply efforts at Kontum enormously. The USAF C-130s flew 20 sorties between 27 and 31 May, dropping 308 tons of supplies to the ARVN defenders. While all the bundles were not immediately recoverable, the defenders were able to secure most of them eventually. By 1 June the VC/NVA had begun to reduce pressure on the town, and by 7 June General Vogt reported that ARVN had complete control of the town. He stated that as soon as ground forces ensured that the C-130s would receive no ground fire on the approach, he would resume C-130 resupply  
133  
landings at Kontum airfield.

(5) Throughout the period from 27 May to 14 June (when the Kontum Airfield reopened for aerial resupply landings), Kontum experienced "no resupply problems." The USAF C-130s--supplemented by VNAF and USAF CH-47s--were able to deliver sufficient supplies to the defenders. Between 1 and  
134  
14 June the USAF C-130s airdropped 1,826 tons of supplies to Kontum.

(5) Patterns demonstrated in enemy activity at An Loc and Kontum were repeated at smaller towns and outposts as well. The VC/NVA attacked an outpost and tried to overrun it. Failing in this effort, they subjected the outpost to heavy fire and surrounded it, beginning a siege. If the airlifters were able to provide supplies, then the VC/NVA usually made one more desperate attempt to seize the position. If unsuccessful, the VC/NVA then reduced pressure and faded away. In Phuoc Tuy Province in MR III, the NVA put intense pressure on the district town of Duc Thanh. (See Figure 5.) Although airstrikes weakened the attackers and relieved



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SOUTH VIETNAM

**PHUOC TUY**  
AND  
**VUNG TAU MUNICIPALITY**

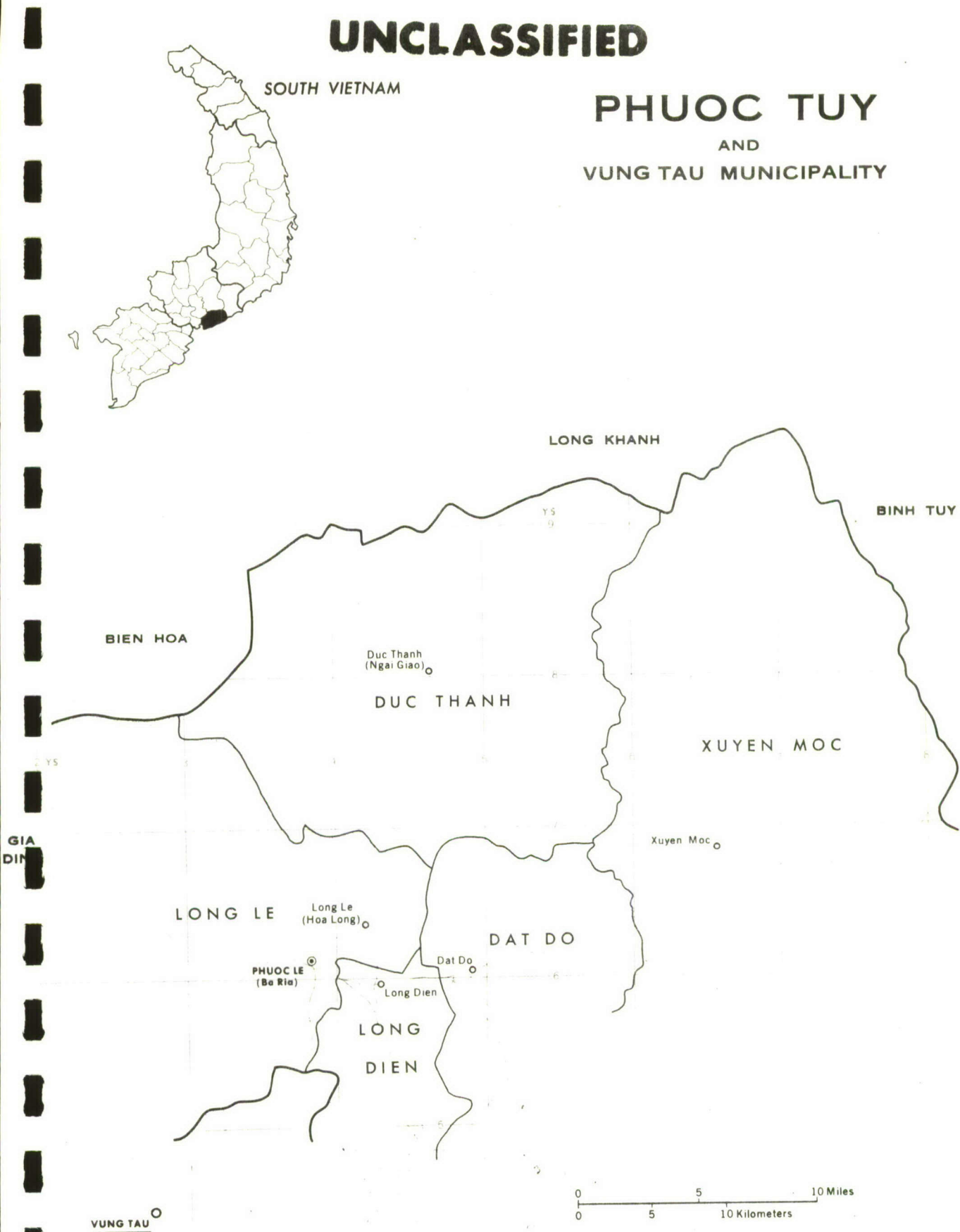


FIGURE 5

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the pressure, gunfire precluded helicopter resupply. Tasked by the JGS to resupply the town, the VNAF made three attempts, all of which failed. With the town "almost completely out of ammunition," USAF C-130s successfully delivered ammunition to the harried defenders.<sup>135</sup> On the following day, eight USAF and 15 VNAF sorties dropped resupply bundles to ARVN troops at Duc Thanh. By 3 June the VC/NVA pressure on Duc Thanh had eased considerably.<sup>136</sup>

~~(S)~~ At Xuyen Moc, in Phuoc Tuy Province, the airlift was also successful, but the case demonstrated a special problem associated with airdrops on very small drop zones. With bridges into the town destroyed and hostile forces surrounding the town, the defenders huddled in a small Regional Forces compound in the northwest portion of the city. As with many besieged positions, the defenders controlled nothing outside their immediate area. Using the very accurate high velocity delivery technique, the USAF was able to provide sufficient supplies so that the ARVN could continue to hold. By 15 June, VC/NVA resolve was weakening and the defenders became more aggressive, picking up airdrop bundles which had not been claimed for two or three days.<sup>137</sup> On the following day, however, the high velocity airdrop caused havoc in the compound. One bundle, containing one ton of canned meat, landed directly on top of the district headquarters, collapsing the building. A second bundle landed next to the small arms ammunition warehouse and caught fire. The fire detonated the airdrop load of 60mm mortar ammunition and trip flares. The explosion in turn set off small arms detonations in the adjacent warehouse, resulting in the loss of 60,000

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rounds of M-16 and M-60 ammunition. In spite of the mishap, the ARVN was  
138  
able to hold.

~~(S)~~ The services had been working on the problem of high explosive detonations in the high velocity airdrop technique since its inception. In the month of June, three high explosive loads detonated on impact; bundles of 81mm mortar, 4.2-inch high explosive shells, and 105mm howitzer rounds were involved. 139 In order to eliminate this problem by providing a softer landing for explosives, the U.S. Army Natick Laboratories made 140 available to MACV a new HALO system, the F-1-B two stage system.

~~(S)~~ The F-1-B two stage airdrop system employs two parachutes to provide a soft landing for the load. During the first stage the load descends at a terminal velocity of 200 feet per second, restrained by a 15-foot extraction chute reefed with a 148-inch reefing line. At a pre-determined height above the ground, an F-1-B barometric pressure sensing device activates a ripcord, pulling the cable on an M-22 10-second delay dereefing cutter. When the cutter fires, it cuts a one-inch tubular nylon ribbing, releasing the 15-foot extraction chute from the load and at the same time deploying a G-12D parachute. The second stage rate of descent 141 is approximately 26 feet per second, which provides a soft landing.

~~(S)~~ On 21 May personnel from the U.S. Army Natick Laboratories arrived at Tan Son Nhut AB to assist in testing the system in combat. Between 5 and 16 June, the Army and Air Force conducted five test drops at Hoc Mon drop zone near Saigon. On the first drop only four of 16 parachutes opened properly. Eight bags broke open due to the high velocity experienced when

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leaving the aircraft. Suspension lines came free, tangling other loads. The most serious malfunctions occurred when the G-12D parachutes deployed at 8,000 to 9,000 feet instead of at 500 feet. These high openers could drift into enemy hands and would delay TACAIR from reentering the drop zone area at the completion of the drop. The remaining airdrops showed improvement, but the malfunction rates remained high. When more than 75 percent of the bundles in the last test functioned properly, the USAF decided to try operational drops.

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(C) On 18 June the Air Force attempted to airdrop high explosives at An Loc using the F-1-B system. While the first day's drops were successful, detonations of the loads dropped on 22 and 23 June demonstrated loudly that the new system had not satisfactorily solved this continuing problem. Overall recovery figures were good, however. From the ground commander's point of view, worse than the chutes that did not open and impacted hard, were the 30 to 40 percent that opened high and drifted out of the drop zone. The Army pointed out that the recovery figures for the F-1-B system were misleading. Many of the high openers were recovered by the defenders, because by the second half of June ARVN controlled all of An Loc and some of the surrounding countryside. The Army stated that "if this method had been employed during the early stages of the battle, it would have been a failure."

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(C) Throughout the summer the USAF and USA were not satisfied with the performance of the F-1-B system. Experiences such as those occurring in

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the first week of operational use at An Loc were repeated wherever the system was used, whether by the USAF or VNAF.<sup>144</sup> In spite of this dissatisfaction, however, use of the F-1-B system increased because of rigging shortages for other methods. In early July, the Quartermaster Advisory Division of MACV suggested that the use of the F-1-B be discontinued in favor of the CBS system for which the Army had previously ordered cutters. The Army argued that the F-1-B system was costly, difficult to rig, unreliable, and the parachutes to support it were in short supply. The CBS system, on the other hand, was cheaper, more reliable, and the Army would soon receive 3.8 million dollars worth of 30- and 50-second CBS cutters. While the USAF was sympathetic to the Army's position, the introduction of the SA-7 had dictated that the C-130s fly above 10,000 feet. Since the 50-second cutters required an altitude of 8,600 feet, they could no longer be used in combat where the SA-7 was suspected. Consequently, the Army instituted immediate actions to halt the acceptance of the 30- and 50-second CBS cutters. In addition, Natick Laboratories began further tests on the F-1-B system in the United States in an effort to improve its reliability.

(c) By the end of August, availability of rigging materials--and not the superiority of one system over another--determined the method of airdrop. On 29 August the exhaustion of the supply of 15- and 22-foot extraction parachutes forced the suspension of the very successful high velocity airdrops. Thus, effective on 31 August, the CBS HALO system

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with 60-second cutters was used for all airdrops with the sole exception  
145  
of high explosives.

(S) In the aggregate, the general picture of airdrops during August demonstrated clearly that while USAF and VNAF cargo aircraft were able to sustain besieged forces satisfactorily, many technical problems remained to be solved. Aided by vast experience at An Loc, the airlifters made drops at that location with outstanding success. Requirements at An Loc of about 28 short tons per day were delivered regularly by both VNAF and  
146  
USAF aircraft.

(S) Elsewhere, too, the events supported the conclusion that airlift was crucial. In Cambodia, the NVA met Khmer Army ground advances with stiff resistance and surrounded Khmer forces at both Kompong Trabek and Svay Rieng. The USAF made nine successful drops at Kompong Trabek  
147  
and 34 at Svay Rieng to aid the defenders. The situation at Minh Thanh in South Vietnam's MR III pointed out that all technical problems had not been solved. The VC/NVA had trapped ARVN elements there in a regional forces compound 200 x 300 meters. Although reasonably secure in this fortification, the ARVN held nothing outside the compound. Thus, the drop zone was limited to the compound itself. Of the 341 bundles dropped there between 7 May and 31 August, only 51 landed in the drop zone or close enough for recovery. At the end of August, the inability to hit the small drop zone with any consistency led the Air Force to seek the aid of the Vietnamese Joint General Staff in neutralizing the enemy in the area. Fortunately, the ARVN troops were able to sustain their position in spite of the prob-  
148  
lems with aerial resupply.



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(C) While the tactical airlift mission to carry aerial resupply to besieged areas did not have the elan of TACAIR or the power of the B-52 strikes, it was no less important in the successful defense of South Vietnam during the 1972 offensive. The C-130 crews had shown great courage during the resupply missions and thus were recognized by commanders as well as by other aircrews. One FAC pilot remarked that the FACs<sup>149</sup>

developed a whole new respect for the C-130 air drop people . . . asking them to fly a huge plane like that at low level and slow speed right in the middle of the most heavily defended area in this [theater of the SEA] war.

But recognition of personal courage would be hollow praise without successful mission accomplishment. This courage plus "professional and aggressive performance," in the words of General Vogt, "materially assisted Allied ground forces in stopping the enemy offensive."<sup>150</sup> Major General Jack C. Fuson, USA, MACV Director of Logistics, pointed out in a letter to Major General Dong Van Khuyen, commander of the ARVN Central Logistics Command, that it was "obvious that without this aerial resupply effort, many areas would have been lost."<sup>151</sup>

(C) In the final analysis, the most rewarding praise came from those on the ground awaiting the supplies. Although ground personnel reported some periods in which items were in short supply, their comments on aerial resupply ranged from "satisfactory" to "magnificent."<sup>152</sup> One U.S. Army advisor at An Loc summarized what this success of aerial resupply meant to his unit beyond the material needs for life and defense. The comment<sup>153</sup> could well apply to those besieged elsewhere during the offensive:

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from a division standpoint and observing the morale and attitude of the staff officers in the division it just had almost an undefinable impact in raising their morale, giving them hope and . . . confidence. It was just totally, as far as I'm concerned, that single factor that has enabled them to sustain themselves, maintain hope, maintain desire, and maintain a limited offensive posture.

The NVA had planned to seize weakened, surrounded forces by strangling resupply efforts with a determined air defense. That Seventh Air Force, the airlifters, and the U.S. Army were able to develop innovations to foil this plan clearly demonstrated once again the need for flexible ideas and professional dedication in conducting operations successfully.

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## EPILOGUE

(U) The airlift experience during the 1972 Nguyen Hue Offensive was to have a long-range impact on tactical airlift procedures and plans. With the deployment of the SA-7, low level CDS tactics could no longer be considered the standard aerial delivery technique. Rather, they could be used only under very limited circumstances in high threat areas. Because of the mobility of the SA-7, however, any area could attain high threat status after just one reported missile firing. Forced above the operating envelope of the SA-7 and the effective range of the North Vietnamese AAA, the Air Force found existing techniques and equipment to be inadequate. Although innovations in the field ensured success of the airlift during the offensive, the new C-130 tactics demanded revisions to standard operating procedures. Further, the total volume of airlift required to support the government forces far exceeded the VNAF's tonnage capacity and called existing plans for Vietnamization of airlift into question.

(S) Faced with the dramatic changes in defenses against the CDS technique, those involved with airlift in the operating theater realized the long range implications for airlift; those further removed did not. For example, on 19 May, by which time three C-130s had been downed and dozens damaged on CDS missions, the USAF Tactical Air Warfare Center (TAWC) forwarded a number of suggestions to improve air drop results. The approach taken was to stress modifications of tactics to make the CDS program more viable.<sup>154</sup> In answering this message, the Director of Airlift for 7AF

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pointed out that the majority of the modified CDS tactics suggested by TAWC had already been tried but had proven unacceptable. He reported, however, that success had been achieved with the combination of GRADS and high velocity drop techniques. He suggested, therefore, that these methods be included in the standard aerial tactics inventory. <sup>155</sup>

The North Vietnamese AAA and SA-7 deployments that forced the revision of operational tactics in Southeast Asia led to a multiplicity of changes in tactical airlift from equipment development to the rewriting of manuals. In its message to 7AF, the TAWC had recognized the changing tactical environment and had called for a conference "to evaluate tactical airlift tactics," to recommend changes to operational tactics used in Southeast Asia, and to improve the overall quality of airlift for the long term. <sup>156</sup> As a result, a conference was held between 31 May and 2 June. At that meeting, immediate suggestions for Southeast Asia included a call for AC-130 support wherever possible and a stated preference for high velocity over HALO techniques. To resolve problems uncovered in Southeast Asia during the offensive, the conference proposed that the USAF develop protective equipment for loadmasters, better radio systems for use in the C-130s, an airdroppable beacon for use in AWADS, and an external flare-launching device. It recommended appropriate changes be made to airlift manuals, such as the inclusion of graphs for parachute ballistics and detailed step-by-step diagnoses of parachute rigging procedures to assist packers and riggers in the field. It also recommended that the USAF work closely with the Army on items of mutual interest, such as improved parachute rigging and the development of improved honeycomb material for use in high velocity airdrops. <sup>157</sup>

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(6) On 8-11 August, PACAF held a second Tactical Airlift Tactics Conference at Ching Chuan Kang AB, Taiwan. Most of the recommendations here followed the general themes of the previous conference. The conferees agreed that tactics found successful in Southeast Asia should be documented in a new tactical airlift tactics manual. The conference recommended specific proposals for inclusion in this manual as well as changes to existing airlift manuals. Some proposals made at the August meeting and not included in the TAWC conference included a call for a container design for high velocity airdrop and special aircrew training for AWADS crews. The conference report concluded with the publication of a list of "lessons learned" which are reproduced in this report in  
158  
Appendix 4.

(6) The other major change which resulted from the airlift experience during the offensive was in the area of VNAF Improvement and Modernization. Prior to the offensive, VNAF had been carrying 80 percent of the in-country airlift load in its C-7s, C-123s, and C-119s. The Vietnamese Joint General Staff had estimated that VNAF should be capable of airlifting about 300 tons of cargo and passengers daily to satisfy the requirements of the Republic of Vietnam Armed Forces (RVNAF). The offensive, however, generated requirements of about 900 tons daily.  
159  
Although VNAF total airlift between April and September "surged more than 30 percent," the VNAF did not have sufficient aircraft to satisfy the requirements. The  
160  
implications for the long term were clear: the aircraft operated by VNAF had limitations and if the USAF "expected the VNAF to be able to do

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their logistic and combat airlift support" then they needed the C-130<sup>161</sup>  
"weapon system."

~~(S)~~ The official documentation to modernize the VNAF airlift fleet with the C-130s had been staffed by both the Air Force Advisory Group (AFGP) and AF during August 1972. The proposal, in the form of a Combat Required Operational Capability (CROC) 26-72, called for the VNAF C-47 and C-123<sup>162</sup> aircraft to be replaced by two 16-aircraft C-130 squadrons. On 1 September the Commander in Chief, Pacific Air Forces tentatively validated the CROC and after securing additional information from 7AF and AFGP forwarded it to the Air Staff.<sup>163</sup> The Air Staff subsequently requested the CROC be administratively cancelled because the requirements involved transfer<sup>164</sup> of existing aircraft rather than developing new capabilities. This did not mean the requirement was considered invalid, however, because the C-130s in question were delivered to VNAF under Project Enhance Plus, and AFGP established C-130 crew training for VNAF. Thus, the transfer of the C-130s made a significant improvement in the posture of the VNAF transport<sup>165</sup> capability.

(U) In short, the Nguyen Hue Offensive had forced drastic changes in tactical airlift procedures in the field. That these innovations had proven sufficient to support the government force during the offensive was to the great credit of both Army and Air Force personnel involved. That the USAF recognized the inadequacies of certain aspects of its airlift techniques, equipment, procedures, and training, and took steps to improve them, was to be of long term benefit to the operational capabilities of both the USAF and VNAF.



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APPENDIX 1

SUMMARY OF AIRDROPS BY LOCATION  
8 APRIL - 31 AUGUST 1972

<u>LOCATION</u>	<u>USAF</u>		<u>VNAF</u>		<u>TOTAL</u>	
	<u>SORTIES</u>	<u>TONS</u>	<u>SORTIES</u>	<u>TONS</u>	<u>SORTIES</u>	<u>TONS</u>
An Loc	429	5,995	72	390	501	6,385
Ben Het	10	148	--	--	10	148
Chi Ling	6	72	3	15	9	87
Dak Pek	29	450	3	15	32	465
Duc Thanh	8	128	5	23	13	151
English	8	70	2	8	10	78
Kontum	127	2,030	--	--	127	2,030
Mang Buc	16	254	--	--	16	254
Minh Thanh	25	334	22	96	47	430
Relief Column (QL-33)	66	1,040	15	62	81	1,102
Xuyen Moc	13	206	3	12	16	218
Miscellaneous	22	414	24	179	46	593
Out of Country	<u>55</u>	<u>584</u>	<u>2</u>	<u>10</u>	<u>57</u>	<u>594</u>
<u>Total</u>	814	11,725	151	810	965	12,535

SOURCE: 90th PMAD "After Action Report"

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APPENDIX 2

COMPARATIVE COSTS OF DIFFERENT AIR DROP SYSTEMS

<u>ITEM</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL COST</u>
1. SYSTEM: F1B			
G-12D	1	\$552.00	\$552.00
15-ft Chute	1	\$ 85.03	\$ 85.03
Skidboard	1	\$ 13.95	\$ 13.95
A-22 Container	1	\$ 87.09	\$ 87.09
Honeycomb	1	\$ 8.25	\$ 8.25
Release, Parachute	1	\$ 72.98	\$ 72.98
Static Line, Cargo	1	\$ 33.83	\$ 33.83
Link Connector	2	\$ .85	\$ 1.70
Tiedown Assy	3	\$ 6.66	\$ 19.98
Connector Strap	1	\$ 1.01	\$ 1.01
10-Second Delay Cutter	1	\$ 2.80	<u>\$ 2.80</u>
TOTAL COST PER 1 TON DROP			\$878.62
2. SYSTEM: CDS Low Altitude			
G-12D Chute	1	\$552.00	\$552.00
A-22 Container	1	\$ 87.09	\$ 87.09
Skidboard	1	\$ 13.95	\$ 13.95
Honeycomb	2	\$ 8.25	\$ 16.50
Clevis G-12D	1	\$ 4.14	<u>\$ 4.14</u>
TOTAL COST PER 1 TON DROP			\$673.68
3. SYSTEM: CBS HALO			
G-12D Chute	1	\$552.00	\$552.00
A-22 Container	1	\$ 87.09	\$ 87.09
Skidboard	1	\$ 13.95	\$ 13.95

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Honeycomb	2	\$ 8.25	\$ 16.50
Clevis G-12D	1	\$ 4.14	\$ 4.14
Cutter/Cartridge	1	approx \$150.00	<u>\$150.00</u>

TOTAL COST PER 1 TON DROP \$823.68

4. SYSTEM: High Velocity (two 15-ft Extraction Chutes)

15-ft Chute	2	\$ 85.03	\$170.06
A-22 Container	1	\$ 87.09	\$ 87.09
Skidboard	1	\$ 13.95	\$ 13.95
Honeycomb	4	\$ 8.25	\$ 33.00
Clevis G-12D	3	\$ 4.14	\$ 12.42
Link Assy	2	\$ 3.60	\$ 7.20
Sling Cargo	1	\$ 19.01	\$ 19.01
Strap Webbing	2	\$ 1.44	<u>\$ 2.88</u>

TOTAL COST PER 1 TON DROP \$345.61

5. SYSTEM: High Velocity (one 22-ft Extraction Chute)

22-ft Chute	1	\$244.00	\$244.00
A-22 Container	1	\$ 87.09	\$ 87.09
Skidboard	1	\$ 13.95	\$ 13.95
Honeycomb	4	\$ 8.25	\$ 33.00
Clevis G-12D	1	\$ 4.14	\$ 4.14
Link Assy	1	\$ 3.60	\$ 3.60
Sling Cargo	1	\$ 19.01	\$ 19.01
Strap Webbing	2	\$ 1.44	<u>\$ 2.88</u>

TOTAL COST PER 1 TON DROP \$407.67

SOURCE: 90th PMAD "After Action Report"

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APPENDIX 3

DROP ZONES FOR BESIEGED FORCES\*

<u>LOCATION</u>	<u>DROP ZONE SIZE (METERS)</u>
An Loc	200 X 200
Ben Het	300 X 400
Chi Linh	200 X 200
Dak Pek	200 X 700
Dak Seang	700 X 200
Duc Hue	500 X 500
Duc Thanh	500 X 500
English	800 X 400
Gia Vuc	200 X 900
Hoc Mon	800 X 350
Kampong Trach	1000 X 550
Kontum	900 X 600
Mang Buk	600 X 300
Minh Thanh	300 X 500
Relief Column (An Loc)	100 X 200
Svay Rieng	400 X 500
Tan Khai	300 X 300
Xuyen Moc	200 X 300

\*Most drop zones varied in size as ground conditions changed. Figures cited are the smallest configurations reported. SOURCE: Weeks, Combat Airdrop Report. (C)

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APPENDIX 4

EXTRACT FROM  
REPORT OF PACAF TACTICAL AIRLIFT TACTICS CONFERENCE  
8-11 AUGUST 1972  
374th TAW CHIING CHUAN KANG AB, TAIWAN

9. LESSONS LEARNED.

a. Following are nearly verbatim remarks by the JTF Tactical Airlift Planner, Major G. E. Lange, (7AF/MAC-DO).

(1) Dictating airdrop method will be the size, terrain and off-set aiming points surrounding the DZ.

(2) The AAA/SAM threat must influence heavily the altitude profile which will be flown.

(a) A forward air controller should be on target in high threat areas. In low threat areas where English is spoken, radio contact with the ground is adequate. When enemy forces completely surround a DZ in strength, enemy fire power against low flying aircraft can be expected to be intense and sophisticated. Under these conditions, low altitude conventional CDS airdrop missions are flown at a very high risk.

(b) The use of various low-level evasive tactics and the element of surprise under the conditions stated above are of minimal value. If airdrops continue against the same target with any consistency, the enemy knows and anticipates the aircraft's arrival and only has to await the low altitude, slow speed run at the DZ to open fire. The enemy brackets the airspace surrounding the DZ in a cross fire. The element of surprise is marginally effective on the first run of the day only. All succeeding aircraft dropping at random intervals can expect intense ground fire.

(c) The use of suppressing fire from other airborne fighter and gunship aircraft is also only marginally effective. When a DZ is totally surrounded by an enemy who is well dug-in, it is near impossible to silence every gun. When selecting an escort, gunships have proven to be more effective than fighters because of air space compatibility and the ability to provide almost continuous suppressing fire around the DZ.

(d) In future SEA combat airdrop operations, the SA-7 missile must be a definite consideration in determining the method and drop altitude profile to be flown and tactics to be employed. In all likelihood, the global AAA/SAM threat can only become more sophisticated and hazardous. Careful evaluation of the threat and selection of the appropriate tactics to minimize the risk factor commensurate with mission accomplishment is an absolute must.

(e) When night low altitude CDS drops are flown to a DZ where intense hostile ground fire is prevalent, incoming artillery makes



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it extremely difficult to obtain night DZ acquisition unless a well marked offset aiming point is available close to the DZ. Therefore, accuracy using conventional CDS procedures at night in SEA has been poor. Methods for providing improved DZ acquisition need to be investigated. Use of the 201X miniponder radar beacon on a limited basis has been very successful.

(f) Based on the above circumstances, low altitude CDS aerial drops are deemed inadvisable. High altitude drops should be strongly considered as the primary method to be trained and developed for future combat airdrops. Positioning means should be positive, i.e., GRADS; AWADS, etc. Conventional low altitude CDS drop tactics should be taught as the alternate drop means in a hostile environment.

b. Both airdrop tactics and hardware developments and requirements must be closely coordinated between the Army and the Air Force.

(1) AFM 55-40 and TO 13C7-1-11 series manuals require updating concerning high or mid-altitude airdrops.

(2) High altitude drops, utilizing the High Velocity System have proven to be an extremely accurate and reliable method to airdrop supplies in a combat situation. In the SEA combat environment, no aircraft making high altitude airdrops have suffered battle damage as of this writing.

(3) The HALO system drops in SEA have improved to the point where 85% of all bundles dropped were recovered during the 1972 NVA offensive. Parachute and rigging malfunctions using this system remain high however. In many cases, bundles that were planned as low velocity "Soft Landing" drops reached the DZ and were recovered, but they had actually descended at high velocity because of parachute or disreefing cutter malfunctions. There are a number of variables with this system. There are many critical items which may malfunction. All conditions must be carefully controlled to insure a successful drop. USAF and US Army should continue joint development of a reliable HALO system of airdrops. Certain items should be dropped using this method, such as high explosives, i.e., mortar and 105 mm ammunition to insure load survivability until better load cushioning material allows better load survivability by high velocity methods.

(4) Both Air Force and Army manuals and training must be flexible and expanded to include recent airdrop developments. They are inadequate at this time.

(a) Strong emphasis should be placed on high altitude, high velocity airdrops as a method of combat aerial resupply. Continuing joint USAF/Army service testing should be conducted to update appropriate USAF/Army operational and technical publications for high velocity and high altitude low opening (HALO) airdrops.

(b) Parachute packing and rigging personnel must be responsive to initial needs for all types of drops. Technical data and proper material



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must be distributed to the field. A vigorous quality control program must also be part of any packing and rigging operation.

(5) Throughout the world, the Air Force must be able to deploy a POSITIVE POSITIONING CAPABILITY against all types of DZ's, flying a low to high altitude profile as required.

(a) The GRADS method of positioning aircraft over the DZ proved outstanding. The coordination effort using this system has been considerable and radar times have not always been easy to obtain but the results have warranted the effort.

(b) The AWADS system of positioning aircraft has proven to be outstanding also wherever suitable offset aiming points can be located within 5 NM.

(c) Further development and testing of other positioning means should continue. The Tactical Air Control System (TACS) should consider becoming equipped with the MSQ-77 type radar to avoid the extensive delays experienced by using SAC's "Combat Sky Spot" when they are working higher priority activities.

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## FOOTNOTES

1. USMACV Directorate of Intelligence Study 73-01, The Nguyen-Hue Offensive, 12 Jan 73, p. 2 (C). (Hereafter cited as Nguyen-Hue Offensive.)
2. Maj Gen Donald H. Cowles, Chief of Staff MACV, "Chief of Staff Action Memorandum No. 71-85," undtd (C); Msg (C), CINCPAC to AIG 152239Z Jan 72 (C).
3. Information regarding enemy plans and Allied intelligence estimates as well as aircraft deployments can be found in Project CHECO Report, The USAF Response to the Spring 1972 NVN Offensive: Situation and Redeployment, 10 Oct 72 (TS). Information in the paragraph is unclassified.
4. Ibid., pp. 21-23. Information extracted is classified no higher than Secret.
5. Project CHECO Report, Invasion of Military Region I: Fall of Quang Tri and Defense of Hue, 15 Mar 73, p. 13 (S). (Hereafter cited as The 1972 Invasion of MR I.)
6. Project CHECO Report, Kontum: Battle for The Central Highlands, 30 March-10 June 1972, 27 Oct 72 (S) surveys the offensive in MR II with a focus on Kontum. (Hereafter cited as Kontum.)
7. Project CHECO Report, The Battle for An Loc, 5 April-26 June 1972, 31 Jan 73 (S) surveys the Battle for An Loc. (Hereafter cited as The Battle for An Loc )
8. Nguyen Hue Offensive, p. 2 (C).
9. USMACV J-3 "Report of Significant Activities" (C) was forwarded to the U.S. Ambassador to Saigon daily during the offensive. A survey of these documents indicates dozens of incidents, both major and minor, every day.
10. Controlled American Source (CAS) Situation Report (SR) FVS 29,279, 14 Apr 72 (S).
11. The 1972 Invasion of MR I (S), passim.
12. Msgs (S) II DASC to 7AF/DO 090755Z and 100400Z May 72; CAS SR FVS 29,616 9 May 72 (S).

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13. Kontum, pp. 13, 14, 26, 30 (S); CAS SR FVS 29,279, 14 Apr 72 (S).
14. 7AF Daily Intelligence Briefing (DIB), 27 Apr 72, p. 7 (S).
15. Kontum, pp. 43, 46 (S).
16. The Battle for An Loc, pp. 17-20 (S).
17. CAS SR FVS 29,177, 4 Apr 72 (S).
18. CAS SR FVS 29,284, 14 Apr 72 (S), CAS SR FVS 29,306, 17 Apr 72 (S), CAS SR FVS 29,406, 24 Apr 72 (S).
19. Col Wm. Miller quoted in Col W. F. Ulmer, Jr., (MACTR-5) "After Action Report, Binh Long Campaign," 20 Jul 72 (FOUO). (Hereafter cited as Ulmer, "After Action Report.") All extracts are unclassified.
20. Charles Black, "Hanoi's Troops Good Soldiers," Columbus (Ga) Enquirer, 19 May 72 (U). A narrative/interview with Col William Miller, USA, Senior American Advisor at An Loc. (Hereafter cited as Miller Intvw.)
21. Intvw (C) Maj John Cash, USA, with Maj Raymond Haney, Inf Advisor at An Loc, 19 Apr 72. (Hereafter cited as Haney Intvw.)
22. The Battle for An Loc, p. 26 (S).
23. "History of the U.S. Advisory Group, Vietnam: Draft for Cy - 1972," undtd, p. 23 (S).
24. Ulmer, "After Action Report," p. 38 (U); 1/Lt Richard Joslyn, 3rd Bde, 1st Cav Div, "Narrative Input for Army Greenbook," 19 May 72, p. 8 (U).
25. Ibid.; Air Force Advisory Group (AFGP)/CC, Position Paper, "VNAF Combat Airlift Operations" undtd (C). (Hereafter cited as "VNAF Combat Airlift Operations.") U.S. Advisors to the ARVN 90th Parachute Maintenance and Aerial Delivery (PMAD) Base, "After Action Report: Air Drop Operation; 8 April 1972-31 August 1972," undtd, p. 1 (C). (Hereafter cited as PMAD "After Action Report.") American Advisors to ARVN 5th Division (at An Loc), "Daily Log," 15 Apr 73 (C).
26. Intvw (C) Maj Paul T. Ringenbach with Maj Robert L. Highley, Chief, Standardization and Evaluation, 374th TAW, CCK, Taiwan, 28 Mar 73. (Hereafter cited as Highley Intvw.)

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27. 7AF (DO-235/Airlift Section), Combat Airdrop Report, 15 April 1972-15 July 1972, undtd, Tab 1, p. 1 (C). (Hereafter cited as Combat Airdrop Report.)

28. Ibid., Tab 1, p. 2 (C).

29. Ibid.; 374th TAW Briefing delivered to the Tactical Airlift Tactics Conference, Eglin AFB, Fla, 31 May 72 by Maj Edward Byra (U). (Hereafter cited as 374th TAW Briefing.)

30. 374th TAW/CC, "Recommendation for Award of Unit Decoration," undtd (C). (Hereafter cited as 374th TAW "Recommendation.") Dave Cole, "Agony of an Airlifter," Airman XVII (Jan, 73), 45-47 (U). TSgt Shaub won the Air Force Cross for his role in saving the C-130 and its crew.

See  
Errata  
Sheet,  
21 Feb 74

31. 374th TAW Briefing, p. 6 (U). Highley Intvw (C); 374th TAW, History, Jan-Jun 72, undtd, p. 43 (S); Ltr (C) Hq TAC/DOLOP to CINCPACAF/DAO, Subj: "Project CHECO, Airlift to Besieged Areas 7 Apr - 31 Aug 1972," 14 Jan 74.

32. Intvw (C) Maj Paul T. Ringenbach with Col Andrew P. Iosue, Commander, 374th TAW at CCK, Taiwan, 28 Mar 73. (Hereafter cited as Iosue Intvw.) Highley Intvw (C).

33. 374th TAW, "Recommendation," (C); Highley Intvw (C).

34. Intvw (U) Maj Paul T. Ringenbach with Capt Robert A. Shumway, Jr., O-2 pilot, 21st TASS, 23 Jan 73. (Hereafter cited as Shumway Intvw.)

35. 7AF, Directorate of Information, News Release #0407, 25 May 72 (U); 374th TAW Briefing, p. 9 (U).

36. Iosue Intvw (C); 374th TAW Briefing, p. 9 (U).

37. Combat Airdrop Report, Tab 1, p. 2 (C); Highley Intvw (C), p. 14.

38. CAS SR FVS 29,358, 20 Apr 72 (S).

39. Air Force Advisory Group, Staff Digest (S), 17-22, 23-29 Apr 72, pp. 2-4 (C). All materials extracted for this report from the Staff Digests were classified no higher than Confidential. The Army ground command claimed almost all the VNAF-delivered bundles ended up in enemy hands. See Ulmer, "After Action Report," p. 39 (U).

40. Combat Airdrop Report, Tab 2, p. 1 (C).



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41. 374th TAW Briefing, p. 12 (U); Draft, "After Action Report Binh Long Campaign," logistics annex, undtd (U). (Hereafter cited as "Draft: After Action Report: Logistics.") TAC Test 70-A "Final Report" recommended 1300 x 200 yards for all high-altitude drops. See Appendix 3, above, for the minimum size of drop zones actually used.
42. CAS SR FVS 29,376, 21 Apr 72 (S).
43. Quoted in Ulmer, "After Action Report," p. 14 (U).
44. 374th TAW Briefing, p. 12 (U).
45. 7AF Form 4 "Summary of Air Drop Operations, 15 April-9 May 1972," undtd (U).
46. Highley Intvw, p. 11 (C).
47. Intvw (C) Maj Paul T. Ringenbach with 1/Lt Timothy N. Carey (Rash 16), 21st TASS, 30 Jan 73. (Hereafter cited as Carey Intvw.) U.S. American Advisors to ARVN 5th Division, "Daily Log," 21 Apr 73 (U).
48. Intvw (C) Maj Paul T. Ringenbach with 1/Lt Peter Collins, Jr., (Rash 05), 21st TASS, 28 Jan 73. (Hereafter cited as Collins Intvw.)
49. Combat Airdrop Report, Tab 1, p. 2 (C); Highley Intvw (C), p. 12. The Directorate of Airlift (DOL) under the DCS/Operations, 7AF, and later Hq MACV took over the responsibility for all airlift in SEA after the inactivation of the 834th Air Division on 1 Dec 71.
50. "Draft: After Action Report: Logistics" (U).
51. Ulmer, "After Action Report," p. 36; 7AF Form 4 "Summary of Air Drop Operations, 15 April-9 May 1972," undtd (U).
52. 374th TAW Briefing, p. 24 (U). This situation was confirmed by both Maj Highley and Col Iosue in their interviews.
53. Maj Gen James F. Hollingsworth, CG TRAC to Gen C. Abrams, "Daily Commander's Evaluation," 241000H-251000H Apr 72 (C). (Hereafter cited as "Backchannels.")
54. Ibid., 251000H-261000H Apr 72 (C).
55. 374th TAW Briefing, p. 20 (U).
56. Collins Intvw (C); Highley Intvw (C), p. 36; Iosue Intvw (C).

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57. Collins Intvw (C).
58. Ibid., Highley Intvw (C), p. 39; Shumway Intvw (C).
59. Carey Intvw (C); Collins Intvw (C).
60. Shumway Intvw (C).
61. Carey Intvw (C).
62. Collins Intvw (C); Highley Intvw, pp. 6, 45 (C).
63. Ulmer, "After Action Report," p. 40 (U); Collins Intvw (C).
64. Shumway Intvw (C).
65. 374th TAW Briefing, p. 25 (U); Highley Intvw., p. 34 (C).
66. Combat Airdrop Report, Tab 1, p. 4 (C).
67. "Support for Night Aerial Missions," Special Instructions for AC-119 and AC-130 Aircraft Frag 72116 working paper (S); The Battle for An Loc, pp. 32-33 (S); "Draft: After Action Report: Logistics (U).
68. "Backchannels," 301000H-010000H May 72 (C).
69. CAS SR FVS 29,536, 3 May 72 (S), "Backchannels," 021000H-031000H May 72 (C).
70. Intvw (U) Maj Walter Scott Dillard, USA, MACV, with Brig Gen John R. McGiffert II, Deputy Commanding General, TRAC, during the Battle of An Loc, 10 Oct 72.
71. Intvw (C) Maj John Cash, USA, MACV, with Maj Kenneth A. Ingram, Senior Arty Advisor to the 5th DCAT at An Loc from 1-31 May 72, 1 Jun 72. (Hereafter cited as Ingram Intvw.)
72. Combat Airdrop Report, p. 4 (C); 374 TAW/DOI to Det 1, 374th TAW (TSN), 210730Z Nov 72 (U); Highley Intvw (C).
73. CAS SR FVS 29,294, 14 Apr 72 (S); CAS SR FVS 29,420, 25 Apr 72 (S).
74. 374th TAW "Recommendation," (C).

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75. Ulmer, "After Action Report," p. 40 (U); Iosue Intvw (C).
76. Highley Intvw (C), p. 14; see Tactical Air Command (TAC Test 71A-024A/TAWC Project 1126), Final Report: AWADS High-Altitude Airdrop, Mar 72 (U-US Govt only).
77. 374th TAW Briefing, p. 11 (U).
78. PMAD, "After Action Report," (C), p. i; Combat Airdrop Report, Tab 1, p. 3.
79. Highley Intvw, p. 15 (C).
80. Collins Intvw (C).
81. Highley Intvw, p. 15 (C); 374th TAW Briefing, p. 12 (U).
82. Air Force Advisory Group, Staff Digest, 17-22, 23-29 Apr 72, pp. 2-4 (C); 7AF/TACLO, "TACLO-7AF Activity Report #10-72, 30 May 72" (S), 020927Z Jun 72. Note: TACLO reports were transmitted to CINCPACAF et al in message format. (Hereafter cited as TACLO Activity Report #10-72, 30 May 72, 020927Z Jun 72.)
83. PMAD, "After Action Report," p. 2 (C).
84. Ibid., p. 2; 374th TAW Briefing, p. 16 (U).
85. Combat Airdrop Report, Tab 2, p. 2-3 (C).
86. 374th TAW Briefing, p. 16 (U); Highley Intvw, p. 25-27 (C); PMAD, "After Action Report, p. 2 (C).
87. PMAD "After Action Report," p. 2, Appendix 1, p. 3 (C).
88. Iosue Intvw (U); 374th TAW Briefing, pp. 12, 14 (U).
89. Ingram Intvw (C).
90. Hq TRAC Debriefing of Capt Moffett and Maj Ingram, undtd, p. 9 (C).
91. U.S. Advisors to ARVN 5th Division, "Daily Log," May 72 (C).
92. "Backchannels," 041000H to 051000H May 72 (C), 051000H to 061000H May 72 (C), 061000H to 071000H May 72 (C).
93. Ingram Intvw, p. 3 (C).

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94. Combat Airdrop Report, Tab 2, p. 4-6 (C); PMAD "After Action Report," p. 3 (C).
95. Collins Intvw (C); Highley Intvw, p. 9 (C); Shumway Intvw (C); 374th TAW Briefing, p. 12 (U).
96. Carey Intvw (C); Highley Intvw (C).
97. Ulmer, "After Action Report," p. 41 (U).
98. "Backchannels," 071000H-081000H May 72 (C).
99. Combat Airdrop Report, Tab 2, pp. 6, 7 (C); PMAD, "After Action Report," p. 3 (C).
100. Msg (TS) Gen John W. Vogt to Gen John Ryan, 021120Z May 72. Only Secret material extracted.
101. PMAD, "After Action Report," pp. 3, 4 (C); Highley Intvw, p. 14 (C).
102. 7AF Form 4 "Summary of Air Drop Operations, 15 April-9 May 1972," undtd (U).
103. Combat Airdrop Report, Tab 2, p. 2 (C).
104. 374th TAW, Briefing, p. 16 (U).
105. Combat Airdrop Report, Tab 6, p. 1 (C); "Backchannels," 081000H-091000H May 72 (C).
106. 7AF Form 4, "Summary of Air Drop Operations, 15 April-9 May 1972," undtd, Tab D (U).
107. TACLO Activity Report #13-72, 1-15 Jul 72, 160430Z Jul 72 (S).
108. "Backchannels," 091000H-101000H May 72 and 101000H-111000H May 72 (C).
109. The Battle for An Loc, pp. 38-39 (S).
110. Ltr (U) MACTR-5-64 to Commanding General, TRAC, Subj: "Resupply Operations to An Loc during the period 4-27 May 1972," 30 May 72.
111. Collins Intvw (C); Intvw (C) Maj John Cash, MACV SJS with Capt Moffett, Deputy Senior Advisor to 3rd Ranger Group, 1 Jun 72.

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- 112. Ingram Intvw, p. 4 (C); McGiffert Intvw (U).
- 113. Ulmer, "After Action Report," p. 42 (U); Ingram Intvw, p. 19 (C).
- 114. Draft Annex J (Coords MR 3) to MACTRC After Action Report, Binh Long Campaign 1972 (C). (Hereafter cited as COORDS Annex.)
- 115. Ingram Intvw, p. 8 (C).
- 116. COORDS Annex (C).
- 117. Ulmer, "After Action Report," pp. 42, 44 (U).
- 118. AFGP Staff Digest, 19-72, 7-13 May 72, p. 2-1 (S). Only Confidential material extracted.
- 119. TACLO Activity Report #10-72, 16-31 May 72, 020927Z Jun 72 (S) and #12-72, 16-30 Jun 72, 020400Z Jun 72 (S); AFGP Staff Digest, 21-72, 21-27 May 72, p. 2-2 (S). Only Confidential material extracted.
- 120. AFGP Staff Digest, 23-72, 28 May-3 Jun 72 (S). Only Confidential material extracted.
- 121. AFGP/CC Position Paper on "VNAF Combat Airlift Operations," 7 Oct 72, Tab A, p. 3 (C).
- 122. Ltr (U) AFGP/DO to MACV J-45, Subj: "VNAF Airdrop Capabilities," 22 Jun 72 with attached "Memo for the Record, 14 Jun 72 (U).
- 123. Operational Combat Evaluation on the Adverse Weather Aerial Delivery System (AWADS), Aug 72, p. 1 (C). (Hereafter cited as AWADS Evaluation.) Combat Airdrop Report, Tab 3, p. 1 (C) is the source of the quotation.
- 124. AWADS Evaluation, pp. 2, 13 (C).
- 125. Ibid., 4-7, 9-11, 14; Highley Intvw, p. 31 (C); 374th TAW Briefing, p. 26 (U); Msg (S) 7AF to 13AF, 190400Z Jun 72.
- 126. TACLO Activity Report #11-72, 1-15 Jun 72, 170817Z Jun 72 (S).
- 127. Highley Intvw, p. 28 (C); AWADS Evaluation, p. 10 (C).
- 128. Msg (C) 13AF/Maj Gen Frankosky to 327AD/Maj Gen Ross, 160745Z May 72.

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129. CAS SR FVS 29,726 17 May 72 (S); CAS SR FVS 29,735, 18 May 72 (S).
130. Kontum, p. 49 et passim (S); CAS SR FVS 29,777, 21 May 72 (S).
131. CAS SR FVS 29,856, 27 May 72 (S).
132. Msg (TS) Gen John W. Vogt to Gen John Ryan, 281000Z May 72. Material extracted is classified no higher than Secret.
133. 374th TAW History, Jan-Jun 72 (S), pp. 51-52; Msg (TS) Gen Vogt to Gen Ryan, 071100Z Jun 72. Material extracted from this message is classified no higher than Secret; Kontum, p. 62 (S).
134. CAS SR FVS 29,882, 31 May 72 (S); 374th TAW History, Jan-Jun 72, p. 52 (S).
135. CAS SR FVS 29,828, 25 May 72 (S); CAS SR FVS 29,850, 27 May 72 (S); CAS SR FVS 29,863, 28 May 72 (S); CAS SR FVS 29,865, 29 May 72 (S).
136. CAS SR FVS 29,868, 30 May 72 (S); CAS SR FVS 29,882, 31 May 72 (S); CAS SR FVS 29,914, 3 Jun 72 (S).
137. Draft, "After Action Report: Logistics," p. 20 (U); CAS SR FVS 29,801, 23 May 72 (S); CAS SR FVS 29,882, 31 May 72; CAS SR FVS 30,043, 14 Jun 72 (S); CAS SR FVS 30,048, 15 Jun 73 (S).
138. Draft, "After Action Report: Logistics," p. 28 (U); CAS SR FVS 30,074, 17 Jun 72 (S).
139. Draft, "After Action Report: Logistics," p. 20 (U).
140. PMAD, "After Action Report," p. 3 (C).
141. Ibid., Appendix 1 (C); Combat Airdrop Report, Tab 4 (C). The explanation for the F-1-B system is taken almost directly from these reports.
142. Combat Airdrop Report, Tab 4, pp. 2, 3 (C); Collins Intvw (C).
143. PMAD, "After Action Report," p. 4 (C).
144. AFGP Staff Digest, 32-72, 6-12 Aug 72, p. 2-5 (C); Combat Airdrop Report, p. 10 (C).
145. Msg (C) MACV/MS to CGAMC, 310756Z Aug 72; PMAD, "After Action Report," p. 4 (C).

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146. Ltr (C) Maj Gen Jack C. Fuson to MACV (CS) Subj: "An Loc Air Drops," 1 Sep 72.
147. 374th TAW History, Jul-Sep 72, p. 33 (S)
148. Ltr (C) Col George L. Grubbs, MACDL to MACDO, Subj: "Minh Thanh Air Drops," 30 Aug 72; Ltr (C) Maj Gen C. M. Talbott (MACDO) to MACDL, Subj: "Minh Thanh Air Drops," 4 Sep 72 (C).
149. Collins Intvw (C).
150. Msg (C) 13AF to 327ADiv and 374th TAW, 160745Z May 72. This quoted a message from Gen Vogt to Maj Gen Frankosky.
151. Ltr (U) Maj Gen Fuson to Maj Gen Dong Van Khuyen, 10 Oct 72.
152. AFGP Staff Digest, 28-72, 9-15 Jul 72 (C); Ulmer, "After Action Report, p. 35 (U); Ingram Intvw (C).
153. Hq TRAC Debriefing of Capt Moffett and Maj Ingram, undtd, p. 9 (C).
154. Msg (S) TAC/DRC to CINCPACAF/DOL, 7AF/DO and 13AF DO, Subj: "Tactical Airlift Tactics," 191700Z May 72.
155. Msg (S) 7AF/DOC to PDAF/DOL, info to 13AF, USAF TAWC, and TAC, Subj: "Tactical Airlift Tactics," 260930Z May 72.
156. Msg (S) TAC/DRL to CINCPACAF/DOL, 7AF/DO and 13AF/DO, Subj: "Tactical Airlift Tactics," 191700Z May 72.
157. Report of the Tactical Airlift Tactics Conference 31 May-2 June 1972, held at the USAF TAWC, Eglin AFB, Fla., passim (S).
158. Report of the PACAF Tactical Airlift Tactics Conference 8-11 August 1972, held at 374th TAW, Ching Chuan Kang AB, Taiwan, passim (C).
159. AFGP "Proposed CROC for Modernization of VNAF Transport Fleet," Jul 72 (C).
160. AFGP/CC "VNAF Combat Airlift Operations," 7 Oct 72 (C); Intvw (S) Maj William Prout, USAF, with Brig Gen R. G. Cross, Jr., USAF Director of Air Operations, MACV, 18 Dec 72.
161. Cross Intvw (S).

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162. AFGP Staff Digest, 33-72, 13-19 Aug 72, p. 2-2 (S). Material extracted is Confidential; AFGP Staff Digest, 34-72, 20-26 Aug 72, p. 2-1. (S).

163. AFGP Staff Digest, 39-72, 24-30 Sep 72, p. 1-5 (S).

164. AFGP Staff Digest, 44-72, 28 Oct-3 Nov 72, p. 1-1 (C).

165. AFGP History (Draft), "Enhance Plus," 26 Dec 72, pp. 23-26 (S).



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## GLOSSARY

AAA	Antiaircraft Artillery
AB	Air Base
AFGP	Air Force Advisory Group
ARVN	Army of the Republic of Vietnam
AWADS	Adverse Weather Aerial Delivery System
CARP	Computed Aerial Release Point
CBS	Confined Ballistic System
CDS	Container Delivery System
CROC	Combat Required Operational Capability
FAC	Forward Air Controller
Good Opening	Parachute(s) opens, load lands without damage
GRADS	Ground Radar Aerial Delivery System
HALO	High Altitude, Low Opening. Parachute is restricted from fully deploying upon release and falls ballistically. Upon descending to a predetermined altitude the chute fully deploys.
JGS	Joint General Staff
KW	Kilowatt
LAW	Light Automatic Weapon
MACV	Military Assistance Command, Vietnam
Malfunction	Any time the parachute(s) does not function normally, whether the load is damaged or not.
mm	millimeter
MR	Military Region
NVA	North Vietnamese Army
NVN	North Vietnam(ese)
Partial Opening	The parachute is out of its (deployment) bag and is partially filled with air, but does not fully inflate.
PMAD	Parachute Maintenance and Delivery
QM Co. (AD)	Quartermaster Company (Aerial Delivery)

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Reefed Parachute	A restraining device does not permit the parachute to fully deploy. This partially filled chute is considered to be in a "reefed" condition and follows a ballistic trajectory.
RVN	Republic of Vietnam
RVNAF	Republic of Vietnam Armed Forces
SOS	Special Operations Squadron
Streamer	A total malfunction in which the parachute fails to open (or opens, but does not fill with air) causing the load to land without restraint.
TAC	Tactical Air Command
TACAIR	Tactical Air (power)
TACLO	Tactical Air Command Liaison Officer
TAS	Tactical Airlift Squadron
TAW	Tactical Airlift Wing
TAWC	Tactical Air Warfare Center
TASS	Tactical Air Support Squadron
TRAC	Third Regional Assistance Command
U.S.	United States
USA	United States Army
USAF	United States Air Force
VNAF	Vietnamese Air Force (RVN)
VC	Viet Cong

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DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS PACIFIC AIR FORCES  
APO SAN FRANCISCO 96553



REPLY TO  
ATTN OF XOAD

25 November 1974

SUBJECT: Errata Sheet, Project CHECO SEA Report, "Airlift to Besieged Areas,  
7 Apr-31 Aug 72 (U)"

to All Holders of Subject Report

Request that the following corrections be made in your copy(ies) of  
subject report:

Cover page, downgrading instructions: Change classified by  
"7AF/CDC" to classified by "7AF/CC." Change declassified on  
31 Dec "Indefinite" to declassified on 31 Dec "1981."

A handwritten signature in black ink, appearing to read "V. H. Gallacher", is written over the typed name.

V. H. GALLACHER, Lt Colonel, USAF  
Chief, CHECO/CORONA HARVEST Division  
Ops Anal, DCS/Plans and Operations

**CONFIDENTIAL**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS PACIFIC AIR FORCES  
APO SAN FRANCISCO 96553



REPLY TO  
ATTN OF XOAD

21 February 1974

SUBJECT Errata Sheet, Project CHECO SEA Report, Airlift to Besieged Areas,  
7 Apr-31 Aug 72 (U), 7 Dec 73 (SECRET) (U)

TO All Holders of Subject Report

(C) Request that the following corrections be made in your copy(ies) of subject report:

a. (C) Page 7, lines 5 and 6, change to read: "C-130 would make its run at 200-500 feet AGL (500 feet at night), slowing down 45-30 seconds from drop zone with an ascent to arrive over the drop zone on altitude and airspeed. Immediately after release the aircraft would descend, increase airspeed, and fly the escape track (lettered A through F) pre-selected by the FAC. The FAC would broadcast heading changes based on his observations of ground fire directed at the C-130.<sup>31</sup>"

b. (U) Add the following item to references in footnote 31:  
"Ltr (C) Hq TAC/DOLOP to CINCPACAF/OAD, Subj: "Project CHECO, Airlift to Besieged Areas 7 April - 31 August 1972," 14 Jan 74."

*V. H. Gallacher*

V. H. GALLACHER, Lt Colonel, USAF  
Chief, CHECO/CORONA HARVEST Division  
Ops Anal, DCS/Plans and Operations

**CONFIDENTIAL**



# UNCLASSIFIED/DECLASSIFIED CHECO REPORTS

1. Project RED HORSE (Unclassified), by Derek H. Willard, 1 Sep 1969 K717.0413-68
2. USAF Aerial Port Operations in RVN (Unclassified), by Jack T. Humphries, 5 Aug 1970 K717.0413-79
3. SEA Glossary 1961-1971 (Revised Report) (Unclassified), by E. J. Alspenger, 1 Feb 1972 K717.0413-76
4. OV-1/AC-119 Hunter-Killer Team (Declassified), by Richard R. Sexton and William M. Hodgson, 10 Oct 1972 K717.0413-34
5. Kontum: Battle for the Central Highlands 30 March-10 June 1972 (Declassified), by Peter Liebchen, 27 Oct 1972 K717.0414-30
6. PAVE MACE/COMBAT RENDEZVOUS (Declassified), by Richard R. Sexton, 26 Dec 1972 K717.0414-35
7. Air Defense in Southeast Asia 1945-1971 (Declassified), by Guyman Penix and Paul T. Ringenbach, 17 Jan 1973 K717.0414-36
8. The Battle for An Loc 5 April - 26 June 1972 (Declassified), by Paul T. Ringenbach and Peter J. Melly, 31 Jan 1973 K717.0414-31
9. PAVE AEGIS Weapon System (AC-130E Gunship) (Declassified), by Gerald J. Till and James C. Thomas, 16 Feb 1973 K717.0414-37
10. The 1972 Invasion of Military Region I: Fall of Quang Tri and Defense of Hue (Declassified), by David K. Mann, 15 Mar 1973 K717.0414-32
11. "Ink" Development and Employment (Declassified\*), by B. H. Barnette, Jr., 24 Sep 1973 K717.0414-41
12. Guided Bomb Operations in SEA: The Weather Dimension 1 February - 31 December 1972 (Declassified), by Patrick J. Breitling, 1 Oct 1973 K717.0414-43
13. Airlift to Besieged Areas 7 April - 31 August 1972 (Declassified\*), by Paul T. Ringenbach, 7 Dec 1973 K717.0414-33
14. Drug Abuse in Southeast Asia (Declassified), by Richard B. Carver, 1 Jan 1975 K717.0414-50
15. Aerial Protection of Mekong River Convoys in Cambodia (Declassified\*\*), by Capt William A. Mitchell, 1 Oct 1971 K717.0414-23

\*Declassification date incorrectly computed on cover of document.

\*\*Declassified by Office of Air Force History, 2 May 1977